

# FORESTRY AND IRRIGATION

Debris from Hydraulic Mining

The Norway Poplar

Domesday Book for Oregon Waters

A National Need

Effect of Late Spring Frost on Trees

Forest Planting in Connecticut

# Thorburn's Seeds

**A**BSOLUTELY the best there are — unequalled for purity and germination, and no more expensive than others.

If you have not already received our CATALOGUE, send for it now. It COSTS YOU NOTHING.

**J. M. Thorburn & Co.**

33 Barclay Street,

Through to 38 Park Place

Established 1802

NEW YORK

Our Solar Transits are superior because the meridional result is more accurate, and observations can be made with greater rapidity.

*Illustrated Catalogue upon application*

**YOUNG & SONS, PHILADELPHIA**

## Have You a Hobby?

It does not make any difference to us with what kind of a hobby you are identified, we can furnish you articles from papers and magazines published all over the world upon any subject you may be interested in. The man who wants to be

### Up-to-Date

needs the help of a good

### Press-Clipping Service

because he cannot read everything himself. It's simply a physical impossibility. Let us read for you—it's our business. Our work saves you much valuable time spent in libraries and reading papers in search for information which can be nowhere definitely obtained. You will be surprised at the results; you will see paragraphs which you would never have been able to find yourself. Drop us a postal and we will point out to you what we can do for you. Price, \$5.00 for 100 clippings.

**H. ROMEIKE, Inc.**

110-112 West 26th St.

New York City

## The Longleaf Pine in Virgin Forest

A Silvical Study.

By G. FREDERICK SCHWARZ,

Author of "Forest Trees and Forest Scenery."

12mo, x + 135 pages, 23 full-page half-tone illustrations and 3 diagrams. Cloth, \$1.25 net.

**CONTENTS.**—Introduction. Character of Virgin Longleaf Pine Forests. Natural Rotation: Evolution in the Forest. Tolerance. Fires. The Soil Cover. Injury to Seedlings, caused by Hogs. Rate of Growth in Virgin Forest. Forest Management. The Aesthetics of Forestry.

**JOHN WILEY & SONS**

43 and 45 E. 19th Street

New York City

th  
re  
s-  
ay  
in

9

ll.  
us  
rk  
li-  
s-  
ly  
e-  
ou  
ll.  
ou  
00

ne

rest

age

-

cter

lat-

rest.

In-

late

rest

try.

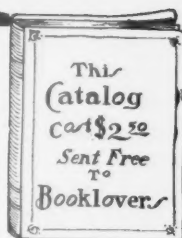




# Editions de Luxe at Half Price

Published by John D. Morris & Co.

## Twenty-one Standard Works



The *Morris De Luxe* editions are the most highly regarded of any published today. Each edition of Standard Authors is limited and offered first to the lovers of fine books who have come to depend upon us to build their libraries.

There are a few of each of the following left after supplying those who buy regularly; and as such an announcement as this brings hundreds of replies, orders will have to be filled in accordance with the date of the requests.

The complete plan and catalogue will be sent upon receipt of the coupon attached.

Clip and mail it at once if you are interested.

## We will send prepaid

to anyone who is really interested in De Luxe Editions of Standard Authors and other important literary works, one of our De Luxe catalogues, which cost us \$2.50 each to make.

John D. Morris & Co., Publishers, have made it possible for those who know and love books, to build their libraries of fine editions at moderate prices.

### COUPON

Gentlemen: Please send me, post-paid, your free catalogue of De Luxe Editions and full particulars of your special limited offer of the sets which I have checked.

	Check (X) Here		Check (X) Here
VICTOR HUGO .....	<input type="checkbox"/>	EDGAR ALLAN POE .....	<input type="checkbox"/>
GEORGE ELIOT .....	<input type="checkbox"/>	GARNER AND LODGE'S HISTORY OF	<input type="checkbox"/>
SIR WALTER SCOTT .....	<input type="checkbox"/>	THE UNITED STATES .....	<input type="checkbox"/>
CHARLES DICKENS .....	<input type="checkbox"/>	GIBBON'S DECLINE AND FALL OF	<input type="checkbox"/>
CHARLES KINGSLEY .....	<input type="checkbox"/>	THE ROMAN EMPIRE .....	<input type="checkbox"/>
LAURENCE STERNE .....	<input type="checkbox"/>	MODERN ELOQUENCE .....	<input type="checkbox"/>
BALZAC .....	<input type="checkbox"/>	EMERSON'S ESSAYS, ADDRESSES	<input type="checkbox"/>
CHARLES READE .....	<input type="checkbox"/>	AND POEMS .....	<input type="checkbox"/>
STEVENSON .....	<input type="checkbox"/>	MCCARTHY'S IRISH LITERATURE .....	<input type="checkbox"/>
HENRY FIELDING .....	<input type="checkbox"/>	PEPYS' DIARY and CORRESPONDENCE	<input type="checkbox"/>
TOBIAS SMOLLETT .....	<input type="checkbox"/>	PLUTARCH'S LIVES .....	<input type="checkbox"/>
DANIEL DEFOE .....	<input type="checkbox"/>	THE WORLD'S BEST POETRY .....	<input type="checkbox"/>
THACKERAY .....	<input type="checkbox"/>	SHAKESPEARE .....	<input type="checkbox"/>

Name .....

City .....

Address .....

State .....

John D. Morris & Co., Publishers, 12th and Chestnut Sts., Philadelphia

F.A.I.J.

THE  
**American Forestry Association**

---

**OFFICERS FOR 1907**

---

**President**

Hon. JAMES WILSON, Secretary of Agriculture

**Vice-Presidents-at-Large:**

Dr. EDWARD EVERETT HALE

Mr. F. E. WEYERHAEUSER

Mr. JAMES W. PINCHOT

Dr. B. E. FERNOW

Mr. JOHN L. KAUL

Secretary, THOMAS ELMER WILL, Washington, D. C.

Treasurer, OTTO LUEBKERT, Washington, D. C.

**Directors**

JAMES WILSON

WILLIAM L. HALL

GEORGE P. WHITTLESEY

JAMES H. CUTLER

RUTHERFORD P. HAYES

HENRY S. GRAVES

F. H. NEWELL

GIFFORD PINCHOT

N. J. BACHELDER

ALBERT SHAW

W. W. FINLEY

GEORGE K. SMITH

WILLIAM S. HARVEY

H. A. PRESSEY

GEORGE F. PEABODY

---

**APPLICATION FOR MEMBERSHIP**

---

To THOMAS ELMER WILL,

Secretary American Forestry Association

1311 G St., N.W., Washington, D. C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. Two Dollars (\$2.00) for annual dues enclosed herewith.

Very truly yours,

Name \_\_\_\_\_

P. O. Address \_\_\_\_\_

..THE..  
**AMERICAN FORESTRY ASSOCIATION**

**President—HON. JAMES WILSON,**  
Secretary of Agriculture.

---

The American Forestry Association was organized in 1882, and incorporated in January, 1897. It now has over 6,000 members, residents of every State in the Union, Canada, and foreign countries. From its origin it has been the tireless friend of the forests.

The object of the Association is to promote the preservation, by wise use, and the extension of the forests of the United States; its means are agitation and education; it seeks to encourage the application of forestry by private owners to forest holdings, large or small; and it favors, especially, the establishment and multiplication of National and State forests, to be administered in the highest interests of all.

The Association seeks as members all who sympathize with its object and methods, and who believe that our natural resources constitute a common heritage, to be used without abusing and administered for the common good. Seeking to conserve our supplies of wood and water, the Association appeals especially to wood-producers and users, including owners of wood lands, lumbermen, foresters, railroad men, and engineers; and to those dependent upon equable stream flow, as manufacturers, irrigators, employers of water power, and those engaged in internal commerce.

The Association meets annually in Washington. It publishes, monthly, **FORESTRY AND IRRIGATION**, the magazine of authority in its special field. The list of contributors to this publication includes practically all persons prominent in forest work in the United States, making it alone worth the cost of Annual Membership in the Association.

The dues, covering a subscription to **FORESTRY AND IRRIGATION**, are as follows: Annual—For Annual Members, \$2; for Sustaining Members, \$25; Total, with exemption from all other payments—for Life Members, \$100; for Patrons, \$1,000.

THOMAS ELMER WILL, Secretary.

Address: 1311 G Street, N. W., Washington, D. C.

# As a Matter of Course

you are interested in knowing what eminent engineers and technical men are writing about, and you want to keep in touch with current development in engineering and general science. We will undertake to keep you informed, no matter in what branch of the profession you may be engaged.

To keep in touch with modern industrial progress, you need simply to subscribe to—

## TECHNICAL LITERATURE

• A • D I G E S T • O F • C U R R E N T • T E C H N I C A L • I N F O R M A T I O N •

It is the only periodical published that **gives in condensed form the best articles** from all the technical publications, foreign and American. It also gives much valuable information from various other sources and not generally found in the regular technical press. An

### "Index to Technical Articles in Current Periodical Literature"

gives a classified, descriptive listing of about five hundred articles of technical value each month and covers the technical periodicals of the world. Ten minutes of your time a month is all that is necessary to survey the "INDEX" and learn what has been printed on the subjects in which you are most interested.

If you are not receiving **TECHNICAL LITERATURE**, send 20c for the current issue. Or better yet! Send \$2 for a twelve months' subscription and get all the technical periodicals in one.

(Canadian price, \$2.25; Foreign, \$2.50)

You Will Enjoy Reading

### TECHNICAL LITERATURE

GE • IT!

Prof. Korn, of the Munich University, Germany, writes: "Your review seems to me one of the most useful of technical publications."

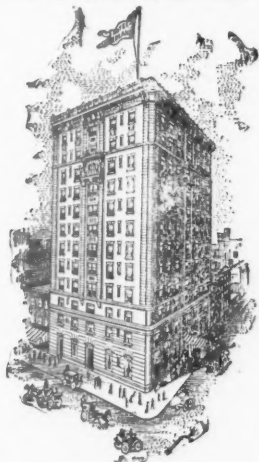
A. W. Buel, Engineer, New York City, says: "I distinctly think you have made good. If you keep up the pace you have set in the first volume, Technical Literature will be a necessary companion for all those who wish to keep posted in any branch of applied science."

## Technical Literature

911 St. Paul Building

New York

**HOTEL CUMBERLAND**  
**NEW YORK**  
*S. W. Cor. Broadway at 54th Street*



*Ideal Location. Near Theaters, Shops and Central Park.*

**New, Modern and Absolutely Fireproof**  
 Coolest Summer Hotel in New York. Close to 6th Ave. "L" and Subway and accessible to all surface car lines. Transient rates \$2.50 with Bath and up. All outside rooms. Special rates for summer months.

**SEND FOR BOOKLET**

Under the Management of **HARRY P. STIMSON**  
 Formerly with Hotel Imperial, New York.  
**R. J. BINGHAM**, Formerly with Hotel Woodward.

**White Mts. MAPLEWOOD HOTEL**  
 Maplewood, N. H.

Principal radiating point to all places of interest in the White Mountains

**Opens July 7th**

**SOCIAL AND SCENIC CENTER**

High Altitude. No Hay Fever.  
 SUPERIOR 18-HOLE GOLF COURSE

**Maplewood Cottage** opposite: Accommodates 135. Open June to Oct.

Terms moderate. Write for booklet

**LEON H. CILLEY, Mgr., 1 Beacon St., Boston**  
**Private Cottages to Rent**

**THE PINES**

**Tallulah Falls, Ga.**

**Miss A. G. STONE, Prop.**

Summer season from June to October. At other seasons by special appointment.

**Rates: \$2 to \$2.50 per day**  
**\$10 to \$15 per week**

**STANDING TIMBER, LOGS, BARK, CORDWOOD AND LUMBER IN WOODS**

**Insured Against Fire**

Applications sent on request. Address all communications

**LELAND D. VAN RENSSELAER**

**Ithaca, N. Y.**

The . . **PAPER** . . . that this publication is printed  
 . . . on is furnished by

**R. P. Andrews Paper Co., Inc., Washington,**

Sole Agents in the District of Columbia for the  
**West Virginia Pulp and Paper Company,**  
 the Largest Manufacturers of Book Paper in  
 the world.

**IF IN NEED, DROP THEM A LINE**



W1060



## A Non-Fluctuating Investment

IN fifteen years this Company has sold \$260,000,000 of Guaranteed Mortgages. No investor has lost one dollar of either principal or interest.

We now offer this First Mortgage Security on New York City Real Estate in the form of

**4½ Per Cent  
Guaranteed Mortgage Certificates**  
in amounts of \$500 and \$1,000

Principal and interest absolutely guaranteed by  
**BOND AND MORTGAGE GUARANTEE CO.**  
Capital and Surplus, \$5,500,000

Invest some of your money where it is absolutely safe and yet earning a good interest rate. The resulting comfort is now available to both large and small investors. Address

Mgr. Certificate Dept.

**TITLE GUARANTEE AND TRUST CO.**

Capital and Surplus \$11,000,000

176 Broadway or 175 Remsen Street  
New York City Brooklyn



## The Continuing Garden

with its succession of bloom and fragrance, from the brave, white flowers which vie with the last snow in purity through a procession of dainty and delicate, as well as rich and gorgeous blossoms to the hardy kinds which defy the first frosts, deserves to be enclosed by a living fence which will set off, rather than obscure, its beauty.

## AMORR RIVER PRIVET

is the ideal hedge for boundaries. Strong and sturdy, it withstands the lowest temperature and never winter kills. Evergreen in the South and practically so in the North. In June and July it bears dainty, white flowers. Large, stocky plants, two to three feet, \$5 per 100. \$15 per 1,000, carriage charges prepaid by us. Book, "Peter's Plants," free to all.

**PETER'S NURSERY CO.**  
Box 1207, Knoxville, Tenn.

## Things Worth While

A COLD STORAGE PLANT will pay for itself in one season. Write for description of Gravity Brine System, stating size and for purpose wanted. Madison Cooper Co., 118 Court St., Watertown, N. Y.

TO MINE OWNERS—You need The MacDonald Hot Blast Sulphide Smelter, for your copper and iron pyrite ores, high saving at low cost. Write us full details. TO INVESTORS—A safe investment in our Smelting Co., pay 8% or more. The McDonald Sulphide Smelter Co., Toledo, O.

TO BUY OR SELL **LAND** FARM or TIMBER  
WRITE TO FRED HAYSEN, ANTIGO, WIS

# FORESTRY AND IRRIGATION

THOMAS ELMER WILL

Editor

## CONTENTS FOR SEPTEMBER, 1907

### LINK RIVER AND A GRAVITY IRRIGATION DITCH IN KLAMATH COUNTY, OREGON

*Frontispiece*

#### EDITORIAL:

Forest Destruction in Colorado	445
Appalachian Lecture Tour	445
National Irrigation Congress	446
A Norway Town Without Taxes	446
Forester Pinchot in the Northwest	447
White Mountain Timber Slaughter	449

#### NEWS AND NOTES:

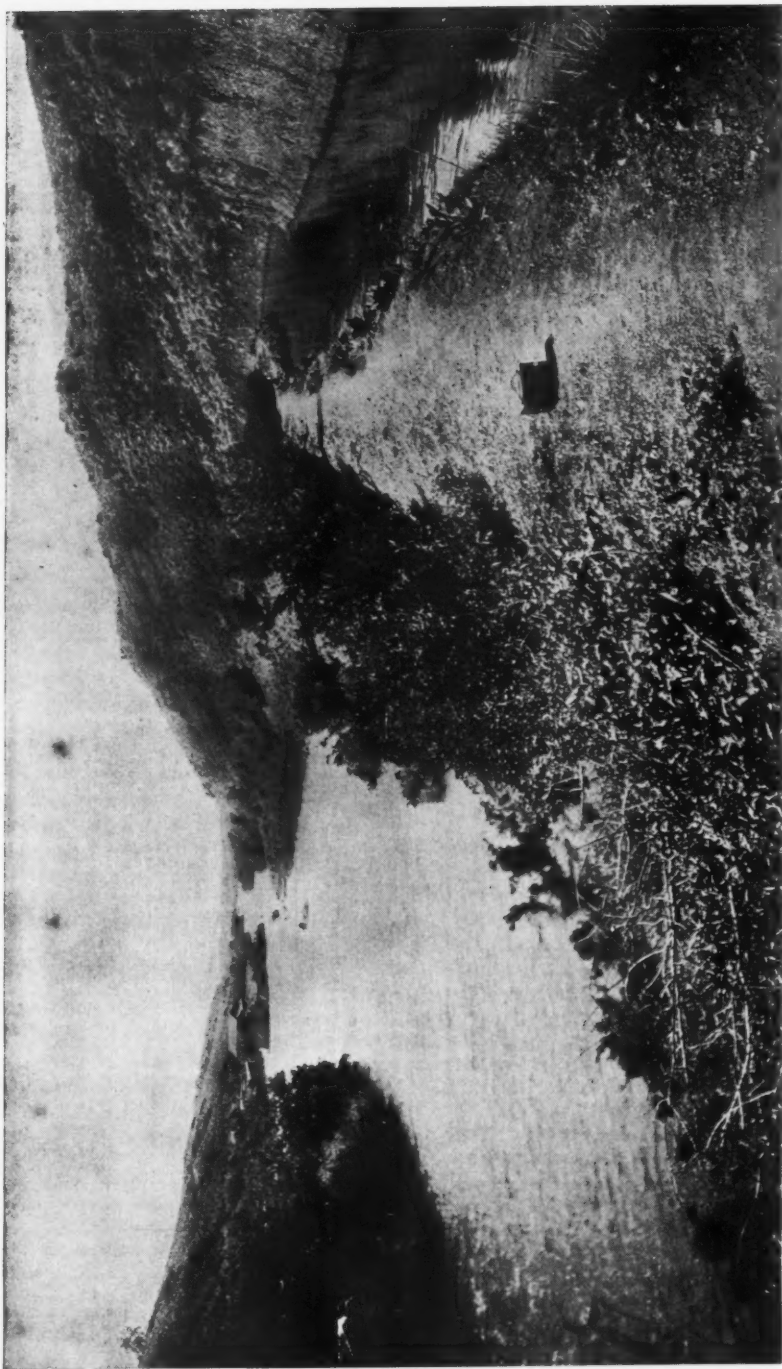
Private Irrigation Enterprises	451
Good Work in New Jersey	451
Russian Government Helps Timber Growers	451
Klamath Jade Mine	451
Jack Pine in Nebraska	452
White Pine Weevil	452
Pennsylvania Forestry Teaching	452
Enlarged Work at Ames	452
How They Study at Baltimore	453
Yale Summer School	453
Extension of Work in Michigan	453
South African Forest School	454
Forest School on Itasca Lake	454
Nebraska and Washington Forestry Professors	454
Opening of Routt County	455
Forester to Advise Lumber Associations	455
Oregon Forestry Commission	456
We Need the Hardwoods	456
Damsite, Texas	456
Rocky Mountain Coal Survey	456

Drainage and Irrigation in Florida	457
Seedlings for Canadian Settlers	457
Forests in Arctic Canada	457
A Protective Railroad Tariff	457
Greenwood Lake, New Jersey	457
Fire Season on Again	458
Responsibility for Fires	458
Fire Loss Can Be Reduced	459
A Dangerous Fire Checked	459
Sugar Irrigation in Porto Rico	460
Forestry for Connecticut Farmers	460
State Foresters to Confer	460
Steel Tie Not Practical	460
Testing Ties by Actual Use	460
Government Control of Ranges	461
Forest Reserves Popular in Colorado	461
Good Use for Poor Soil	461
Quick Benefit from Reforestation	462
Miscellaneous Forestry Notes	462
Should Let Trees Grow Bigger	462
Another Adirondack Grab	462
Secretary Wilson's Inspection Trip	463
Scattering the Light	463
River Improvement Convention	464
Artesian Wells Pump Themselves	464
Hawaiian Forests Enlarged	464
Pennsylvania's Tree Growing Bounty	464
Where Does Our Lumber Come From?	465
Fewer Sheep or None At All?	465

THE NORWAY POPLAR, OR SUDDEN SAWLOG. ( <i>Populus Nigra</i> )	By C. S. Harrison	466
U. S. FOREST SERVICE		467
THE DEBRIS FROM HYDRAULIC MINING IN CALIFORNIA.	By Maj. William W. Harts. ( <i>Illustrated</i> )	471
A DOMESDAY BOOK FOR OREGON WATERS. ( <i>Illustrated</i> )		476
A NATIONAL NEED. By Edwin A. Start. ( <i>Illustrated</i> )		481
EFFECT OF A LATE SPRING FROST IN THE SOUTHWEST. By Frank J. Phillips. ( <i>Illustrated</i> )		485
FOREST PLANTING IN CONNECTICUT, 1907. By Austin F. Hawes		493
U. S. RECLAMATION SERVICE		495
THE TORRENT. ( <i>Poem</i> )		496
RECENT PUBLICATIONS		497

FORESTRY AND IRRIGATION is the official organ of the American Forestry Association. Price, \$2.00 per year, including Annual Membership in the Association. Copyright, 1907, by The American Forestry Association. Entered at the Postoffice at Washington, D. C., as second-class mail matter.

Published Monthly at  
1311 G STREET, N.W. WASHINGTON, D. C.



Link River and a gravity irrigation ditch, in Klamath County, Oregon

# FORESTRY AND IRRIGATION

OL. XIII

SEPTEMBER, 1907

No. 9

## EDITORIAL

### Forest Destruction in Colorado

Speaking of the havoc wrought with the scenic attractions of Colorado, the *Denver Republican* says:

"Travel where and how we may in our mountains, the eye is met with the charred remains of forests made desolate by fire, or laid waste by the ax. Attractive as our mountains are, how much more so would they be if they were as verdant as the slopes and precipices of Switzerland!"

To such a condition has the policy of unregulated private exploitation brought the Switzerland of the West! Some of this desolation can probably never be redeemed. Man is the one animal which wastes his birthright and seeks to destroy the very planet on which he lives. The vandalism of the individual can be met only by the exercise of the conserving and restoring power of the whole people. Whatever may be possible in the way of saving something out of the wreckage in Colorado and in healing the scars inflicted by private money-grabbers, the Forest Service is doing and will do. The *Denver Republican* should be among the first to rejoice.

### Appalachian Lecture Tour

The American Forestry Association believes that whatever is good for the people should be understood by the people. It believes that those who are working for a measure of public benefit should take the people into their confidence. Believing profoundly in the wisdom and necessity of the Appalachian Bill it is doing its best to bring the merits of this measure to the attention of the people.

On his trip, early in July, to Chicago, the Secretary of the Association arranged with prominent publications of that city for a considerable degree of publicity. Since July 1st, the Association has been sending to several hundred papers a weekly press bulletin containing forestry matter. The accumulation of clippings resulting therefrom testifies to the kindly reception given this new effort. In the first half of August the Secretary visited New York and Boston and arranged in those cities for still more publicity for the Appalachian question. By request, he visited the Greenacre Conference and spoke on "The Wreck and Rescue of Our Heritage," show-

ing how our natural resources, notably our forests, are being destroyed and how the work of rescue, through the agency of government, State and notably National, is now on. On the 28th of August he is expected to discuss this question before the National Association of Box Manufacturers at its meeting in the Catskills.

More important still, the Executive Committee of the Association has arranged to organize lecture tours for the Secretary in the South and Middle West. Responses from leading Southern cities indicate that the tour through the South, to begin late next month, will meet with the hearty reception that section knows so well how to accord.

The tour is being arranged through the co-operation of boards of trade and chambers of commerce. Almost every response from these has been both affirmative and cordial. The lectures will, wherever practicable, be illustrated by lantern slides, and the endeavor will be made to bring home to every auditor the certain effect of the destruction of the Appalachian Mountain forests and the sole remedy. The Western tour is expected to follow the Southern. Such inquiry as has already been made indicates that the glad hand will be extended by the West as well as by the South. Through the co-operation of the press of the cities visited, which past experience indicates will be readily granted, it is believed that this tour may prove an effective factor in arousing the people to the importance of the establishment of National Forests in the East and South. Those interested in these lectures may address the National office of the Association in Washington.

**The National Irrigation Congress** If a noble cause, combined with efficient, aggressive and enthusiastic propaganda, count for anything, the Fifteenth National Irrigation Congress, to meet in Sacramento, California, September 2d, should prove a tremendous success.

The busiest spot in Sacramento is said to be the headquarters of the Congress. Correspondence is there carried on by wholesale, day and night. A large force of clerks and stenographers is employed handling this huge epistolary campaign. The only local rival to this place is the post office, to which individual, personal letters, not circulars, by scores of thousands, are carted from the office of the Congress.

A tremendous attendance at the series of events being arranged for that city in September, and an unprecedentedly successful session of the Congress in point of size, importance and influence, are confidently expected.

Among the attractions of the Congress are \$25,000 in prizes, including a magnificent and extensive trophy list. Twenty massive gold and silver vases and loving cups of exquisite workmanship are offered. Among the awards announced for farm exhibits are three thoroughbred, registered bulls of highest grade, two having a cash value of \$1,000 each.

An unusually large amount of space will be devoted to forestry. The Secretary of Agriculture and the Forester are expected to be present. Special effort has been made by the American Forestry Association to secure the attendance of a northern and a southern representative of the eastern reserve proposal, that this important question may be properly set before this great gathering.

**A Norway Town Without Taxes**

"The town of Faleide, Norway, imposes no taxes on its lucky inhabitants," says the London, Eng, *Bystander*. During the last thirty years the authorities at Faleide have sold over \$5,000,000 worth of trees; and, by judicious replanting, have provided for a similar income every thirty years. In consequence of this source of commercial wealth, there are no taxes in Faleide, and local railways and telephones are free, as well as education and drinks—upon the King's birthday!"



How Utopian the suggestion, at first blush, of a "town without taxes!" Yet the explanation is simple. Instead of permitting all its forest lands to become private property, to be cut over, burned over, and converted into a desert, this town has simply retained an area for its own use, and has administered the forests thereon in accordance with forestry principles. In consequence, the community enjoys a permanent income from a permanent estate; an income, furthermore, sufficiently large to render taxation unnecessary.

But why should the idea of public property, publicly owned and administered for the public benefit, appear so unusual and surprising? The silver mines of Laurium were the property of Athens and a source, to that community, of substantial revenue. The town of Fairhope, Alabama, owns a wharf, fees for the use of which constitute a valuable source of revenue for the village. In the heart of Chicago, including, in fact, the site of the Tribune building, is a sixteenth section which, happily, unlike so many other sixteenth sections, was not sold for a song that its proceeds might be frittered away. Instead, it was retained as a part of the public property of the city of Chicago and, under the law, its rents are turned into the public school fund. The splendid sum thus received each year by the city schools is a striking illustration of what schools all over the public land area of the United States might be receiving from their sixteenth sections had they been as wise, in this regard, as Chicago.

And what is true of sixteenth sections is truer of larger areas. If the United States had retained a reasonable portion of its public domain instead of throwing it away with prodigal hand, and conferring empires upon railroads, think of the revenue therefrom which might now be pouring into the public treasury, and the work which might be done with it!

There still remains something of the public domain. A portion of this is occupied by our National Forests.

Other portions are occupied by coal lands. Shall we be wise in time and retain these coal lands for the benefit of the whole people, or shall we permit them, too, to pass into the hands of trusts which, when another coal famine comes, may charge us what the market will bear? The experience of Faleide presages eloquently the possibilities of our National Forests, as timber slaughter on privately owned forests continues and the price of lumber and all lumber products soars aloft like the Fourth of July balloon. Who, then, will not commend the wisdom which has conserved so much, at least, of our National heritage for the benefit of all the people throughout all time?

**Forester** Mr. Gifford Pinchot, **Pinchot in the** United States Forester, **Northwest** is spending some time in the Northwest, visiting the National Forests, meeting the people, seeking information and freely dispensing it. As is inevitable in such a case, this tour is accomplishing great good; misunderstandings are being cleared up, objections met, prejudices banished and the people of the Northwest are coming to see what the National Forest policy actually is and what fruit it may be expected to bear.

In June and July Mr. Pinchot spent some time in Idaho. If his work is opposed anywhere, it is opposed in that State. The *Cœur d'Alene Press* said of Mr. Pinchot's visit:

"It was unquestionably the means of a better understanding between the Chief Forester and the people on matters in dispute, or over which uncertainty existed. Mr. Pinchot is \* \* \* not the autocrat many had been led to believe. \* \* \* We believe the forestry policy of the Government is not only right, but the one means of saving the country from becoming a timberless nation. The question may be divided into two classes; one being the perpetuation of the forests through protection and reforestation by the Government, and the other their destruction within the next fifty years to sat-

isfy the rapacity of the present generation for a few paltry dollars. One is the broad, philanthropic view which takes into consideration the rights of generations yet unborn; the other is the selfish view for the present alone. \* \* \* Preserve the forests and save our civilization."

The Boise *Statesman*, for July 4th, said:

"Forester Pinchot, who is on a tour of the West for the purpose of meeting the people and explaining the plans and the methods of the Forest Service, is doing most excellent work. At his recent meeting in Cœur d'Alene he faced an audience that probably contained more opponents of the forest reserve system than any that could be gathered elsewhere in the country. Mr. Pinchot told these people frankly what the real purposes of the Forest Service are. He explained the law to them; he demonstrated to them that the regulations are consistent with the law, and he made it plain that the purpose of the Government, in enacting and enforcing this law, in creating reserves or National Forests—and establishing efficient administration of them, is doing a work of inestimable value to the people of the State and to the entire country.

"In that meeting he was deluged with questions, but he answered them in such a manner that candid persons could not fail to be convinced. He is a perfect master of the subject. He is an enthusiast, perhaps, with respect to preservation of the forests and protection of the water supply. He has made that subject a study; he has visited many sections that have been almost desolated by destruction of their timber, and he knows the necessity for preserving the forests for the benefit of the people of this and succeeding generations. He is, therefore, able to direct the minds of his hearers to the truth, and the truth will always prevail with an American community notwithstanding any prejudice that may have existed because of misapprehension of the facts."

Restating after Mr. Pinchot the Government policy of using the wood but saving the woods, the *Statesman* adds: "That cannot fail to appeal to right-minded people anywhere, whether they be living in the vicinity of our great forests or have their homes on the treeless plains; and we may feel certain that the soundness and the wisdom of the position of the Government is going to be accepted without question by all our people, and that all citizens of every portion of the State will become loyal supporters of the National Forest system notwithstanding prejudices they may have heretofore entertained against it."

This is but another confirmation of the proverb that "Truth is mighty and will prevail." There is no doubt that a considerable body of people in the West had received false impressions regarding the National Forest policy, its objects and results. Many probably thought of a National Forest as a species of game preserve from which the public were shut off and the resources of which were made unavailable. The word "reserve" was partly responsible for this. The reserve policy, prior to the transfer of the reserves to the Forest Service, was probably in part responsible. Some no doubt thought of the National Forests as hindering the development of the local communities, as shutting in agricultural land from use as such, as hindering the building of railroads and as otherwise obstructing healthy growth.

Such misconceptions could be met, in part, only by the demonstration of actual administration. Yet the demonstration, when made, had to be brought to the attention of the Western people. How many of us know what our next-door neighbor is doing, or what is going on a block away? The Forest Service might be working administrative wonders in the field and yet many people living but a few miles distant might remain uninformed. For the Forester to go into the National Forests and see for himself what his helpers were doing

and then to go into the adjoining communities, meet the people individually and in public gatherings, state his case, hear their questions and criticisms, and meet them with facts, was one of the best things he could possibly have done. With a wise policy wisely and efficiently administered, followed by adequate publicity bringing the facts to the public attention, the Forest Service, in a nation governed by public opinion, is bound to win.

#### White Mountain Slaughter

To see the White Mountain situation with his own eyes, the editor of this publication has recently visited the Switzerland of America. From the summit of gray Mt. Washington he witnessed a sunset and a sunrise, looked down on clouds and gloried in the mighty panorama stretching away on every hand. On the ascent and descent he noted the changes in vegetation occasioned by changes in altitude and climate. He saw old forests but a few inches in height, and pondered the lesson thus taught of the power of environment upon all living things.

The following day, in company with the Forester of the Society for the Protection of New Hampshire Forests, Mr. Philip W. Ayres, he climbed Mt. Lafayette and, from its top, looked out over an area of some twenty-five thousand acres of forest land made desolate by the ax and awaiting the inevitable sacrifice by fire. Here, indeed, was a sample of "clean cutting." The area in question is owned by the firm of J. E. Henry & Sons which for some two decades has been lumbering in the White Mountain forests. This firm does business on a large scale. It owns its own pulp mill; it owns its own locomotives; it builds its own railway lines into its harvest fields, cuts its own trees, bears away, works up or otherwise disposes of its own spoil and, in general, "does as it will with its own."

This forest area was being cut clean, the writer was informed, for

two reasons: first, a pulp mill can utilize almost any size of wood; second, trees left standing would interfere with the general process of harvesting. Whether wanted or not it is more convenient for the firm to cut them than to leave them stand. Of course, the future does not enter into the consideration of men lumbering on such principles. We live not in the future but in the present; as for posterity, "what has it done for us?"

The following day, with the help of a guide, the writer covered some twenty-eight miles, eighteen or nineteen being traversed on foot through brushwood and logs, across streams, over rocks and stumps, and, on the last few miles, through magnificent and almost undisturbed forests.

This trip lay, for the most part, through Zealand Valley. The writer has surnamed this region "Death Valley." Here is a scene which, once witnessed, can never be forgotten. For eighteen or twenty years the Henries and the fires have worked their will with this devoted region. It is of this area, or one near and similar, that the venerable Edward Everett Hale has exclaimed, "It makes a man cry to see it." Of the mountain named after himself such a declaration might well be made. But if this be true, tears could not do justice to conditions farther up the valley and probably not seen by Dr. Hale.

Imagine a Greenwood or Mount Auburn swept by a tidal wave of flame and, later, washed by the rains of heaven. On every hand masses of white stone, scattered in wild confusion, rear their heads; and here, there, and yonder, like so many disinterred skeletons, are strewn the wreck of what was once a magnificent forest. Perching upon the boulders, like so many deers' antlers inverted, and bearing mute, pathetic witness to the forest's fate, are the stumps and roots of what were once great trees. Stretching up the mountain side to the westward is a great forest culled by the ax and killed by the fire. On the mountain side to the east, not even this sad

relic remains. Here, from base to summit, appear only the bald, bleak rocks.

But, for the climax of desolation, we must go on. Afar off, on the east side of the valley, we see it. Drawing near, its full meaning is revealed. We have reached the "slides." Here is a mountain side once covered by a rich growth of primeval forest. Ax and fire have, however, swept away the last vestige of vegetation and, with it, the soil itself. Beneath what was once the soil lie the rocks, not stratified but heaped and tumbled in wild disorder by glacial action. The forest floor once filled the interstices between these rocks, and the forest roots bound them firmly together and held them in place. But, these conservative agencies removed, inertia and friction alone remain to resist the force of gravity and water on the steep incline.

Some day, probably after a heavy rain, one or more rocks near the summit broke from their moorings and started down the grade. As a boy, you may have stood a row of bricks on end, knocked down the first against the second and watched the effect upon the entire row. Perhaps these bricks might be arranged in many rows, radiating, fan-like, from a common initial point, with the result that turning over the first brick will work the overturn of the whole assemblage. If, now, you can conceive of this collection of bricks as radiating not only transversely, but vertically, you may understand the philosophy of the land-slide as hinted at by the guide. In any event, some force, operating near the summit of the cliff, starts the rock. Down it rushes, growing by what it feeds upon; increasing, in obedience to the law of falling bodies, its velocity and momentum till finally, like a mighty avalanche of rock, ploughing a frightful chasm in the mountainside, and sweeping all before it, it tears its way in mad confusion to the bottom of the valley, to dump its debris into the streamlet peacefully winding its way toward the sea.

In the space of a short walk thirteen of these slides were counted. Occasionally, on a steep declivity and in consequence of heavy rains, a slide will occur in the untouched forest. Much more will it follow deforestation; and the guide, an old resident, declared that every one of these thirteen had come since the forests were cut.

To this complexion do we come at last! That a single individual or family may get rich, natural beauty, forest wealth and even the very land itself must be destroyed! Nature, unaided, must work and wait a thousand years to repair the wreck wrought in this landslide region by one man and his sons in the quest for gold.

But this is not all. The Henry Company's operations are not confined to the two areas visited by the writer. Nor are the Henries the only forest wreckers in the White Mountains. Other great companies are operating there; and as surely as were Sodom and Gomorrah, so surely are the White Mountains doomed unless action, and speedy action, be taken.

What action? One kind alone can meet the case. To preach to the timber slayer to stay his hand were as profitable as to preach to the north wind that pours down from the pole, or to the waves that beat against the rocks. Private business is run for private profit. The almighty dollar is the one god worshipped by its devotee. In turning an Eden into a desert he violates no law that he is bound to respect. Instead, he obeys the law of present gain.

The only law that can check these ravages is law enacted by the representatives of the sovereign people. If the White Mountain forests are to be saved they must be saved by the American Nation. Legislation must be enacted by the National Congress. The area involved must be made public property and administered by public authority for the public good. This will save what remains of the wreck and this alone will save it.

## NEWS AND NOTES

### Private Irrigation Enterprises

The Cimarron Valley Land Co. will construct irrigation works in the Cimarron Valley, northeastern New Mexico. The main reservoir will be constructed at the junction of Moreno and Cieneguilla Creeks, and the main canal, twenty miles long, will run along the divide of the Cimarron and Rayado Rivers to the uplands south of the Rayado.

Nine hundred acres of land east of Spokane will be put under irrigation soon by the owners of the property. Twenty owners of land have organized a co-operative concern to be called the East Spokane Irrigation Company. It is the plan to sink wells to supply water, an abundance of which is available within fifty feet of the surface.

Preliminary investigations are being made by the Twin Falls Power Plant, for irrigating all lands between the mountains and the Snake River that are not under irrigation. The project is to construct dams at Warm Spring Creek, Trail Creek, and Hailley. The work includes aqueducts, ditches and canals, and is estimated to cost \$5,000,000.

Large tracts of land in Sweetgrass County, Montana, have been segregated by the State under the Carey Act, and the project for its reclamation is under consideration. Six gaging stations have been established for measuring stream flow within the tract. Elsewhere in this issue will be found a picture of a river gage.

Mosquito, Ore.—The board of directors of the Snake River Irrigation District, in Oregon, have authorized an issue of bonds for \$325,000 to build a complete pumping plant for the irrigation of the district.

### Good Work in New Jersey

New Jersey is making splendid progress in its forest park reservation policy under the able and energetic administration of Mr. Alfred Gaskill, the State Forester.

On the Bass River Reservation the Forester planted 5,000 Michigan jack

pinus this year. He has 50,000 seedlings of various kinds in the Bass River nurseries, and has started seed that will produce half a million young trees. He has planted 50,000 young trees in the Newark watershed, and 22,000 on the State Experimental farm at New Brunswick.

### Russian Government Helps Timber Growers

At Warsaw, Russia, there has been formed an official information bureau concerning timberlands. The bureau gathers information as to where and what forests are for sale in Poland, the topography of these forests, their distances from navigable stream or railroad station, the quality of the timber, etc. All this information is given out free. The aim of the bureau is to assist the land owners and the lumbermen in dispensing with the services of private agents in obtaining such information.

Though Russia has the largest forest area of any nation—more than 600 million acres—stumpage prices in Poland are almost as high as those in Germany. Poland exports a great deal of timber, and the importers of Polish timber are, of course, constantly interested in both quantity and quality of the supply and in the location of the timber tracts. Manufacturers of woodworking machinery, also, are keenly alive to every opportunity to market their wares.

From inquiries frequently received by the Forest Service at Washington, it is plain that there is a wide, general demand among wood users for accurate information on forest resources and market conditions everywhere. This search for information indicates very clearly that far-sighted business men are recognizing the limits of our timber supply.

### A Jade Mine Discovered

On Indian Creek, one of the tributaries of the Klamath River in the Klamath National Forest, Siskiyou County, California, is the only jade



mine in the United States. It was discovered by an old prospector of the Klamath River, in 1906, and last summer samples were sent to Germany to test.

Reference to Webster's Unabridged will disclose to the uninformed that the jade is a stone, commonly of a pale to dark green color but sometimes whitish. It is very hard and compact, capable of a fine polish, and is used for ornamental purposes and for implements, especially in Eastern countries and among many early peoples.

The people of Siskiyou County are proud of this discovery and hope for large returns from it. Preparations are under way for shipping the rock to Germany, where it will be worked into ornaments. A railroad will probably be built down the Klamath River within a few miles of the mine.

**Farmers Planting Jack Pine in Nebraska** The shipment, this season, by one nursery alone, of 600,000 jack pine seedlings to the farmers of Nebraska indicates an extensive movement in forest planting. And many other forest-tree nurseries are doing business in the same region.

Throughout the entire country forest planting is on the increase. The general prosperity among farmers is a partial explanation; but a more important cause is the great progress made in knowledge of what and how to plant to advantage. Any one now may learn what kinds of trees will best suit his particular purpose and locality.

The jack pine has been used extensively for planting in the sand-hill regions of Nebraska. The success of the Forest Service in making this tree grow where native timber was altogether lacking caused many others to try it, and it is being planted more extensively each season by ranchers and farmers.

#### **The White Pine Weevil**

The Bureau of Entomology has been conducting investigations of the weevils which infest the trunk bark

and the terminal shoots of conifers. A report, Circular 90, has just been issued on the white pine weevil. This species has been confused with another species of very different habits, so that some of the previously issued data are practically valueless. This weevil is destroyed by treatment of the infested terminals.

#### **Pennsylvania Forestry Teaching**

The State of Pennsylvania has about 28,000,000 acres of land, of which only 8,000,000 are in farm crops and meadow; though some is in pasture, the proportion of forest land is large. The Pennsylvania State College has accordingly established a Department of Forestry, which was opened the present year with an enrollment of thirty-nine students. There is a four-year course, leading to the degree of Bachelor of Science; two years are given to fundamental sciences, the forestry subjects proper occupying the last two years of the course. Amongst these are dendrology, timber physics, silviculture, forest mensuration, lumbering, forest administration, and history. A synoptical course is given for the students in agriculture.

The Department will include a professor and instructor, besides special lecturers for certain subjects, as fish culture, and logging methods. The State of Pennsylvania has forest reserves to the extent of nearly a million acres, which are in the central part of the State, where the State College is located.

Frequent excursions to neighboring forests, occasional visits to wood-working establishments and mills, and longer visits to lumber camps and forest reservations for practical work form part of the program.

#### **Enlarged Forestry Work at Ames**

During the past year a new course was added to the work in forestry at the Iowa Agricultural College, entitled Wood Technology. This course was planned largely for advanced students in civil and mechanical engineer-

ing. Six men took the course in the past semester.

During the coming year, the new Agricultural Building will be completed, in which a considerable portion of one floor will be given to work in forestry. Beside the offices, there will be a large and well equipped room for the laboratory in wood technology; a large space will be taken up by the forestry museum; and there will be seminar and reading rooms, beside class rooms.

Professor Baker, in charge of forestry work, has hitherto given but six months to the College, and six months to the U. S. Forest Service. Beginning this summer he will give his whole year to the College.

#### How They Study at Biltmore

The Biltmore Forest School is encamped this summer in the heart of the huge mountain wood known as Pisgah Forest, owned by G. W. Vanderbilt, near Asheville, N. C. All lectures are given in the forenoon of the day. The students spend the afternoons, guided by their professors, in geological, botanical and zoological excursions. At the same time, the class is kept in touch continuously with the logging and milling operations conducted in Pisgah Forest, under the management of the Director of the School. The logging operations of the coming campaign are being planned with the co-operation of the students; the tram roads, logging roads, bridges, trestles and lumber roads surveyed by the students are now in course of construction in the proximity of the mill sites selected on Davidson's River. The primeval timber tributary to the new mill sites—yellow poplar, oak, chestnut, ash, linn, maple, hickory, birch—has been estimated by the students.

The Biltmore nurseries and the silvicultural progress of the plantations made under the eyes of the students in the spring of the year, at Biltmore (124 acres planted in white and yellow pine, larch, maple, cherry, ash,

gum), are studied, from time to time, on a flying ride to Biltmore.

Unless it pours there is no indoor laboratory work. The laboratory for the forester is the forest, and in that laboratory the Biltmore student is confined as long as he stays at Biltmore.

#### Yale Summer School

The summer courses of the Yale Forest School are given this year, as usual, at Milford, Pa. As in the past three years, there are two courses: the regular summer term of the two years' course, lasting ten weeks; and the short course of seven weeks, designed for those who are not prepared to take the advanced technical course. This is the seventh season of the short course. The faculty consists of Prof. H. S. Graves, Mr. H. H. Chapman, Mr. A. H. Graves, Mr. N. C. Brown, Prof. J. C. Tracy, Mr. C. S. Franham, and a second instructor in surveying. The camp, located on the estate of Mr. James W. Pinchot, furnishes plentiful facilities for recreation in addition to school work.

#### Extension of Work in Michigan

The Forestry Department of the Michigan Agricultural College has received most favorable consideration recently. The Board of Regents have authorized the employment of a man whose chief duty will be to study and work out the farm woodlot problem in this State. He will visit on request, as far as practicable, owners of woodlots that need attention, and will lecture at farmers' institutes and other public gatherings.

The recent legislature set aside 40,000 acres of land in Iosco and Alcona counties for a forest reserve, to be managed by the State Board of Agriculture, the income from the reserve to be applied to the benefit of the Agricultural College. The Board of Agriculture is charged with the duty of caring for and reforesting this reserve with white and Norway pine and other valuable timbers for which the soil is found suitable, using as far as

possible the available students of the College, for whose instruction and practice the reserve is to be utilized. The Board has authorized the employment of such help as is necessary for making a preliminary examination of the most compact body of these lands, lying in two townships.

The forest nursery at the College has been extended to include five acres, which have been laid off into blocks separated by drives and walks. A large amount of seed was planted last spring and a large amount of stock was transplanted. Surplus stock was disposed of to outside parties.

#### **South African Forest School**

The opening of a Forestry School in South Africa, a year ago, marked another advance in the propagation of the forestry idea. The school was established by the government of the Cape of Good Hope at Tokai, Cape Colony, for the purpose of training men for the government forestry service in the several South African provinces.

The course covers two years, the first year at the South African College, and the second year at the Forestry School, at Tokai, on a long-established estate, where there is extensive forest land and a great variety of trees in all stages of development.

#### **A Forestry School on Itasca Lake**

The State Forestry Board of Minnesota has arranged to have a summer school of forestry at Itasca State Park. Twenty thousand acres surrounding Itasca Lake, the historic source of the Mississippi River, is already a State Park and Game Preserve. The legislature gave this park to the Forestry Board, appropriated \$3,500 a year for its maintenance, and gave permission to establish a demonstration school of forestry thereon under the management of the State University regents, as part of the present forestry school.

The course in forestry is a four-year undergraduate one leading to the degree of Bachelor of Science in For-

estry. Owing to lack of forest land and the present arrangement of the university courses, very little practical work is possible. The acquisition of Itasca Park will make it possible to add ten months of practical work in the woods. This and other extensions have necessitated an additional assistant professor of forestry. The position will be filled by Mr. S. B. Detwiler, of the Forest Service.

Mr. Detwiler is at present chief of the Section of Co-operation in the Forest Service. He has been in the Service since 1903. He was formerly connected with the planting station in the Pike's Peak Forest, and has made planting plans in various sections of the country. He is now engaged on an examination of the forest lands of the Coleman Lake Club, in Wisconsin.

Itasca Park contains over 45,000,000 feet of standing pine, mixed white and Norway, several thousand acres of tamarack and cedar swamp, some hardwood land, and some cut-over waste land. The opportunity for all kinds of forestry work, surveying, seeding and planting, thinning, protection, lumbering, road building, management and all kinds of silvicultural work, is unlimited. Sixteen students are working in the park this summer, putting in fire-breaks and making a valuation survey.

An attempt will be made to manage the tract as a model forest where lumbermen may see the results. The scheme will also involve the establishment of a forestry experiment station. The enterprise will be a long step in the advancement of forestry education.

The presence of the lake, a large summer hotel, an abundance of game and fish, and a variety of forest types and conditions, combine to make this park an ideal place for a forestry school.

#### **Changes in Nebraska and Washington**

Prof. Francis Garner Miller, head of the department of forestry of the University of Nebraska, has accepted a similar post in the University of Washington, at Seattle. He is

a graduate of the Iowa University, and of the technical department of Yale, where in 1903 he received the degree of master of forestry.

In September, 1903, Professor Miller was called to the University of Nebraska, to organize and take charge of the newly created department of forestry. This he has done with rare success, and in but four years has placed it on a firm practical basis and given it a permanent place on equal footing with other departments of university activity. During the year 1906-7 just closed the department reached over 300 men in the University, and had thirty registered for a full course in forestry.

The forestry department in the Washington State University is also a new enterprise.

Professor Miller will be succeeded in Nebraska by Mr. Frank J. Phillips, who has been with the Forest Service for about five years. Mr. Phillips is a native of Michigan, where his father was in the lumber business, and the son grew up in the woods, his experience being both in the hardwoods of southern Michigan, and in the pine forests of the north. Mr. Phillips graduated at the Michigan Agricultural College, and took his master's degree at Ann Arbor. In his Forest Service work he has traveled in nearly all parts of the Union.

Mr. Eric O. Siecke, of the United States Forest Service, has been elected to take charge of the newly created department of forestry in the Washington Agricultural College, at Pullman. Mr. Siecke is a graduate from the University of Nebraska, receiving the degree of Bachelor of Arts in 1904, and that of Bachelor of Science in Forestry in 1905. During his connection with the Forest Service—since July, 1905—he has been assigned to various important fields in the Middle and Far West. He enters upon his duties at Pullman September 1.

**The Opening of Routt County** Colorado's first opening of irrigated land under the Carey Act will take place September 5th, when the Little

Snake River Valley, in Routt County, will be thrown open for selection. The rush has commenced and preparations are being made for several thousand people. There are about 50,000 acres of very fine land to be sold by the State at \$50 an acre. The water right, however, costs \$25 per acre, and must be bought at the same time from the Irrigation Company. The water right includes a share and proportionate ownership in the 65-mile canal and reinforcing reservoir.

**Forestry Expert to Advise Lumber Men** The Southern Cypress Manufacturers' Association recently appointed Dr. Hermann von Schrenk as technical expert for the association, to secure the best utilization of the output of the various companies of the association. Dr. von Schrenk is well-known by reason of his frequent contributions to the forest literature of the country, and on account of the interest in forestry by railroads and lumber companies brought about largely through his investigations.

Lumber manufacturers are showing themselves ready to take advantage of increasing knowledge of forestry. "The associations have furthered this work," says the *American Lumberman*, "in a number of instances, the most notable of which is the erection of the chair of practical lumbering in Yale, but no such definite step of immediate interest to any class of manufacturers has before been taken. \* \* \* New conditions are confronting the lumber trade; the era of careless ripping up of logs into boards is approaching an end. The successful lumber producer must adapt his product to the particular needs of particular consumers."

What a technical expert of the association can do is to make the investigations necessary to the adaptation of the product to the markets—investigations as to the best methods of manufacture, new uses of each wood, and how to fit each wood for its particular uses. Thus, mill men will get better prices and the consumer will be

enabled to secure the variety of wood best suited for his use and manufactured in the most economical way.

#### **Oregon Forestry Commission Organized**

In accordance with the act of the last legislature, Governor Chamberlain has announced his appointees to compose the Oregon Forestry Commission. The commission met in Salem, and effected an organization. It was decided that about 400 persons interested in the protection of forests from fire will be appointed fire wardens, without pay from the State, though most of them will be in the employ of timber owners. Five hundred copies of the new forest fire law will be printed for the information of wardens.

There is some trouble over the provision of the new law which requires persons wanting to burn slashings to get permits from a fire warden. There was, a short time ago, only one warden in the whole of Clackamas County; and the inconvenience, it was feared, would result in persons disregarding the law. Laws should be so made that they can be obeyed without unreasonable difficulty; but, because details of a law make inconvenience, it does not follow that there should be no regulation at all of such a dangerous thing as the burning of slashings.

#### **We Need the Hardwood**

In an article on "Strong Arguments in Favor of the Appalachian Reserve," Mr. H. M. Hale says, in the *National Coöperage Journal*: "All things considered, it seems strange that the Nation has not, in its 150 million acres of national forests, a single pure hardwood forest, but such is the case.

"With a few exceptions, such as red gum, cotton wood, chestnut, etc., the hardwoods grow very slowly as compared with the conifers, and, as previously stated, their reproduction after lumbering is not a simple problem. It is, therefore, not difficult to predict with certainty that individuals or corporations will not attempt to

produce hardwoods, as they will do with conifers; at least, not hardwoods of large dimensions, such as are required for saw-timber.

"The proposed Appalachian Reserve embraces a region supporting the richest hardwood forests in the United States, and probably in the world."

#### **Damsite**

Damsite is the name of a new town in Texas, recently included in the list of post-offices. It is a village located on the 10,000-acre farm of Col. Cecil Lyon and associates in the Texas Panhandle. They have their own system of irrigation, and are not selling the land, but will cultivate it, employing about 200 farm hands. A commissary store is conducted as a part of the farm enterprise, and a large amusement hall has just been finished. The aim is to make Damsite a model community.

#### **Survey of Rocky Mountain Coal Field**

The demand for information regarding the coal lands of the Western States, both by the Government and by the public at large, has been so pressing that the Geological Survey has undertaken to devote a large amount of its appropriation during the coming fiscal year to their investigation. This work is under the general direction of Mr. M. R. Campbell, director of the Division of Economic Geology.

The people have not yet forgotten the coal famine of 1902 nor are they unaware that, even while that famine was on, the possible coal supply of the United States was prodigious. The President's attempt, at the last session of Congress, to protect the people against such a contingency in the future, was worthy of the fullest support. It is earnestly to be hoped that our remaining great coal fields on the public domain will not be permitted to pass into the hands of "engrossers and forestallers." The coal underlying this country is for the people of this country. If corporations controlling



it cannot make it available to them in their time of need, other methods of making it available will be found.

**Drainage and Irrigation in Florida** A tract of forty-seven square miles, known as the Haw Creek property, located in the southern part of St. Johns County and the northern part of Volusia County, Florida, is being drained and irrigated. This work is under the direction of Mr. E. Ben Carter, formerly general roadmaster and engineer of the Florida East Coast Railway. It is to make available some of the richest land in Florida. It is believed that the two years preliminary work already done demonstrates its feasibility. On these Florida lands it is sometimes necessary to supply normal moisture artificially, after removing by engineering works the causes of excessive moisture.

#### **Seedlings Given to Settlers**

The recently issued annual report of the Superintendent of Forestry, for the Dominion of Canada, signed by Mr. E. Stewart, the late incumbent, refers to the policy of furnishing seedlings of trees grown in the government nurseries to settlers in the Northwest. Since the spring of 1901 over 7,000,000 seedlings have been distributed throughout Manitoba, Saskatchewan and Alberta. The great majority of the plantations are in excellent condition, eighty-five per cent of the trees living. Those set out in former years under this scheme are now beginning to attain a height visible for long distances across the prairie, and to furnish the shelter so much needed on a prairie farm. This work is described in detail by the Assistant Superintendent, A. H. D. Ross; he points out that the protection afforded by these shelter belts has caused a large demand upon nurserymen for ornamental and fruit trees. The report is largely illustrated.

A suggestion was made by Mr. Stewart at the last meeting of the Canadian Forestry Association that the Government insert a stipulation in

all patents for wooded lands issued hereafter, that ten per cent of the land shall be kept permanently in forest.

#### **Forests in Arctic Canada**

Mr. Stewart says elsewhere in this report: "With a view of obtaining some knowledge of the forestal conditions of our far northern districts, I have just concluded a long journey down the Mackenzie River waters as far as Fort McPherson, near the Arctic Sea, returning by way of the Porcupine and Yukon Rivers. \* \* \* In the basins of the Athabasca, the Peace, the Liard, and other tributaries of the Mackenzie, as well as in the valley of that great river itself, are contained vast quantities of timber. The spruce, white and black poplar, birch, tamarack and jack pine are the principal varieties, the spruce being by all odds the most valuable. Though it was impossible for me to see more than a very small area of the timbered territory, there can be no question that these northern regions contain a very great quantity of spruce timber large enough for lumber, and a practically unlimited supply of pulp wood material."

#### **A Protective Railroad Tariff**

The Hill and Harriman railroads have announced a new freight rate on lumber, a rate of ten cents per hundred pounds. The *St. Paul Dispatch* says this can have no other effect than to reduce the consumption, and sarcastically commends the railroad men for thus protecting the forests. "The trees will be preserved by discouraging the growing tendency of the poor man to provide himself with a home."

#### **Greenwood Lake for the People**

The Patterson, N. J., *Press* is afraid that Greenwood Lake, with its mountainous shore, may become a private park preserve. This lake, lying on the New York and New Jersey State line, and covering 2,000 acres, has been for generations a public resort, as has Lake Hopatcong.

The legislature has authorized the State Forest Commission to acquire the two lakes for the State, but did not appropriate sufficient money, and it is feared that "pretty soon the State won't fine any lake property to buy except at extravagant or prohibitive rates."

But why should not the State take this property by eminent domain, and pay the new owners only a fair price? They would not be morally entitled to a speculative monopoly valuation.

**Fire  
Season on  
Again**

Visalia, Cal.—Fire raged all night along the foot-hills ten miles east of this city, devastating seventy-five square miles. The entire population is fighting the fire.

San Raphael, Cal.—A forest fire broke out to-day at the head of Little Carson Canyon. The Maillard property was swept, and 1,000 acres of land have been devastated.

Eastport, L. I.—A forest fire has swept through the woods, dried by the long drought, a 40-mile gale helping it along.

Bellingham, Wash.—Forest fires have been raging all day on Lake Whatcom, and have destroyed hundreds of acres of shingle bolts and created ruin in many logging camps. Unless rain falls soon this year's fires on Lake Whatcom will be the most destructive of any thus far.

Munising, Mich.—Bad forest fires are reported in the Two Heart district in Luce County.

Gridley, Cal.—A great forest and grass fire broke out Wednesday on the Wyandotte and Bangor road. The fire is gaining in extent and sweeps onward. The machinery, mill and buildings of the Wyandotte Mining and Milling Company were destroyed.

Port Angeles, Cal.—Forest fires in the vicinity of the Filion Mill and Lumber Company's works did considerable damage to timber belonging to

the mill company. The mill's crew worked hard for a week trying to check the fire.

Spokane, Wash.—The forest fires which have been smoldering in the woods near Point Susan have started up afresh and are causing a great deal of damage. The Susan Bay end and the country for miles around are so densely covered with smoke that the sun is obscured for hours every day.

Aberdeen, Wash.—The Weyerhaeuser Timber Company has six parties of timber cruisers out as fire patrols. Besides looking for fires, they are to arrest any one violating the laws in regard to starting fires.

Duluth, Minn.—Gen. C. C. Andrews, the State Fire Warden, has caused the arrest and conviction of a deputy fire warden in Cook County, for failure in reporting a forest fire. The report was neither prompt nor complete.

**Forest  
Fires in  
New York**

A dispatch from Utica, August 18th, announces serious forest fires in the vicinity of Tupper Lake. The first started on the timber tracts of the International Paper Company and the Brooklyn Cooperage Company near Tupper Lake. Later the fire broke out in a big lumber camp at Bryant's Siding. It was gotten under control but it again broke out and menaced the whole lumber camp.

At Schroon Lake, near the camping ground of the Adirondack Club, a fierce fire was raging on the 18th. It had then burned through a heavy pine forest to the lake. The dry weather made the forest inflammable, and the fire swept through as if the forest were so much powder.

**Responsibility  
For Fires**

Popular opinion holds railroads responsible for many fires which are supposed to be started by sparks from engines. An investigation is to be made regarding the responsibility of the railroads for forest fires on Long Island. A new law in Massachusetts

requires railroad employees to extinguish any fire along the line of the road and the engines to sound the fire alarm.

Prof. Fernow compares the camper who leaves his fires burning to a man lighting a fire in a littered back yard of a city house. If such a one should boil a pot of tea and then go away, leaving the fire, and several fine residences were burned, he would be held guilty of arson. An equally great loss to property, and sometimes to life, is caused by the careless incendiary in the woods.

The morals of the community should be educated to the point of regarding incendiarism in the woods as equally culpable with incendiarism in the city. Nobody would stand by while a man burns down his neighbor's house, and there is nothing in the laws of courtesy, says the *Montreal Star*, which should compel anybody to stand by while a man burns down a valuable forest. A few prosecutions for carelessness in this matter would do a lot of good.

#### Fire Loss Can be Reduced

The Government has demonstrated that forest fires may be controlled in nearly all cases, and that the enormous damage in past years might have been prevented had proper measures been taken. During the fiscal year ending June 30, 1907, 1,123 fires were reported to the National Forester of the United States. The average area burned over by each fire was 102 acres; and the total was 155,415 acres. This was about eight acres in 10,000. The preceding year the burned area was twenty-six acres in 10,000, and that was the best record up to that date.

The forest ranger is the scout who searches out the enemy, fire. He rides alone through the wilderness, climbing mountains and scanning the horizon for the thin column of smoke telling of the fire. When he discovers a blaze, he rides to it and put it out himself, if possible; if not, he summons by telephone the rest of the forest force.

Many people suppose that forest fires cannot be controlled, but must be allowed to burn out. This is a mistake. Though some loss must be expected, extensive loss can be abolished, and it should be. Cutting down this waste to the extent of seventy per cent in a single year is a fine achievement, and in a matter as large as the forests of the country such work should not be neglected by either public or private owners.

#### A Dangerous Fire Checked

A lane twelve miles long and forty feet wide through the Chiricahua National Forest in Arizona, cut by Supervisor McGlone and a force of sixty men, has stopped a fire which originated outside the Forest and crossed into it. The first telegram announcing that the conflagration was under control has been supplemented by further details.

It was the most threatening fire, and the most extensive, in the National Forests this season. It advanced with a front ten miles long through a region of such dense brush that the usual manner of fighting a forest fire could not be followed, and the heroic method of cutting a track through the jungle was employed. Bushes, logs, and all grass were removed from the strip, and the work required nearly two weeks. The Copper Queen Smelter, located in that district, furnished thirty-six Mexican laborers to assist the rangers and settlers in the fight.

With axes and shovels the road was cut through the chapparal ahead of the fire, across its entire front, and outflanking it by a mile on either end. Backfiring from the lane headed off the conflagration, and the pine forest was saved.

It was one of the boldest and most extensive schemes of fire fighting ever successfully carried out in this country. It was possible because plans had been worked out in advance to meet just that emergency, should it arise. Plans of similar kind are prepared in advance for all the National

Forests where fire danger is great. When the crisis comes all available men are concentrated at the point of vantage, and science and forethought try conclusions with the fire.

Had the fire crossed the twelve-mile lane or had the fighters failed in their calculations, valuable pine forests would have been burned. It was a long, difficult, and spectacular fight, but it proved the wisdom of preparing for war in time of peace.

#### **Sugar Irrigation in Porto Rico**

Mr. G. M. Hall, of the Department of the Interior, has been sent to Porto Rico at the request of Governor Post to study and devise a plan for the irrigation of the Guayama, Salines and Arroyo districts, where much sugar is grown.

The drought worked much injury to last year's sugar crop. The Legislature has appropriated \$4,000 to defray the expenses of the investigation. Mr. Hall has done irrigation work in New Mexico, Arizona and Texas.

#### **Forestry for Connecticut Farmers**

The proportion of improved land in Connecticut has largely decreased in fifty years, and intensive farming has lessened the demand for pasturage. It is, therefore, important that the increasing area of unimproved land should be put to use in forestry. The State Agricultural Experiment Station, through its Forester, offers to give aid and advice to owners of woodlands. Where desired, a personal examination of the woodland will be made, and planting plans arranged, provided the owner will pay expenses. Complicated plans are to be avoided, chestnut and pine being most largely recommended.

#### **State Foresters to Confer**

A meeting of forestry officers of the various States and Territories of the Union which maintain forestry bureaus has been called by the State Forester of California, and will be held in Sacramento simultaneously

with the Fifteenth National Irrigation Congress. The purpose of this meeting is to bring together the men charged with the administration of State forest laws for discussion of their mutual problems.

#### **The Steel Tie in Practical Tests**

Engineers of the Pennsylvania Railroad Company, reporting upon experiments made by the company in the use of steel ties in place of wooden ties, recently recommended that the experiments be discontinued, for the reason that they had failed to prove steel a satisfactory substitute. For a number of years all sorts of efforts have been made to use steel and concrete in place of wood for ties, because of the expense attending the renewal of wooden ties. So far, most of these efforts have failed, and there seems no present prospect that wooden ties are to be supplanted.

Far more promising is the work undertaken not only by the Pennsylvania but by other roads, notably the Atchison, Topeka and Santa Fe, and the Delaware and Hudson, with a view to husbanding and increasing the wooden tie supply by the ownership and management of forest lands.

#### **Making Final Tests of Ties**

A short stretch of railroad belonging to the Chicago & Northwestern Railroad Company is being laid in Southern Wisconsin on which various methods of preserving ties by chemical treatment will be put to the test of practical use, with the co-operation of the U. S. Forest Service.

Laid in the track of the main line where all trains will pass over them, the ties will be subjected to the wear of traffic and the attack of the fungi which cause decay. It is hoped that this test will go far toward determining the best preservatives and the most practical way of applying them.

Other tests than those on the effect of preservatives will be made with this track of treated ties. Each tie will be identified by a brass check. Various

devices for reducing the mechanical wear and tear will be used. Inspection from time to time will be made, and valuable conclusions are anticipated as to the whole subject of making ties last as long as possible.

**Government Range Control** "When Western stockmen who are now complaining against the proposed Government control of the public grazing lands understand the details of the legislation they will approve it," says Mr. A. E. de Ricqlès, chairman of the grazing committee of the American National Live Stock Association.

"The proposed law provides for the organizing of grazing districts, and the people of the West will have the control of matters in their own hands. The grazing tax is to be nominal and the surplus will go to the States. Ninety per cent of the tax collected will go to the States, which will thus reap a revenue from these public lands, where they get nothing to-day."

**Forest Reserves Popular Here** The Montrose (Colorado) *Press*, under the above title, gives a two-column discussion of the grazing question.

"The very nature of things makes it impossible to separate the timber question from the grazing question. Up to the time forest regulations were made, the users of the public ranges had no rights that any one could be legally forced to respect. This applies to ranges outside of the National Forests to-day. Should a sheep owner conclude to use a range always before used by cattle, no one had a right to prevent it. Should large capitalists decide to bring in large bunches of cattle or sheep and starve out the local owners, they had a perfect legal right to do so. The only law was the law of might, and who can tell how many lives were lost, to say nothing of the stock slaughtered, because some men were able to do it."

Remarking that it is not necessary to go into Wyoming or Texas for ex-

amples, the *Press* cites a number of conspicuous Colorado instances of strife and loss—"All because no one had authority under the law here to prevent such disputes, provide punishment, etc. \* \* \*

"The reasons why the stock growers endorse Mr. Pinchot's plan are easily understood. Stock is allowed on National Forests to the limit of their capacity, but it is the policy of the Forest Service that persons living in or near the forests and owning small bunches of stock shall be first provided for. These are the home builders, the supporters of towns, schools and churches. These are the ones first drowned out in an overcrowded range. What an invitation to be able to advertise to prospective settlers, that a place will be provided for them to range a small bunch of stock!

"The next class of applicants provided for are the larger local owners. \* \* \*

"The *Press* is glad to state that the users of the Uncompahgre National Forest Reserve have only good words to say for the service furnished them last season; and that the stockmen on Log Hill, Dallas, Cow Creek, Sawtooth, and neighboring ranges, seeing and knowing the advantages to be gained, are asking what to do to get this and the Ouray National Forests extended to include all the range."

**Reforming Enthusiastic Supporters** The Idaho *Statesman* makes this significant remark:

"In every locality where the farmers living in the vicinity of the reserves have become acquainted with the methods and policies of the Forest Service, they are becoming enthusiastic supporters of the system, and it is going to multiply the number of small owners, which will directly increase the prosperity of the settlers."

**Good Use For Poor Soil** When Governor Pingree visited the Black Forest and saw the magnificent growths of trees, one belt forty years old, another sixty, another

eighty, all husbanded with the greatest care, he was specially struck by the poorness of the soil. "Why," he said, "we have no worse land than this in Michigan." "Nature will in the end force upon the new world the economies it has prodigally disdained," says the *Springfield Republican*.

#### Early Benefits

The Brooklyn *Eagle*, writing on reforestation, calls attention to the immediateness of the benefit: "The effect of the tree planting in restraining the floods would be felt long before the trees were full grown. The leaf fall of every autumn would contribute to the mass of spongy mold which holds back the water, and the leafage of a brush-grown hill is quite as heavy as that of timbered land. The method of protection is too simple to need argument. The present disastrous losses ought to create just that public demand for the reforestation which is needed to secure National or State action."

#### Miscellaneous Notes

The interest in forestry is rapidly growing in Vermont. The evidence of this interest is the frequency with which the State Agricultural Experiment Station at Burlington is asked for advice in regard to tree planting.

Mr. E. M. Griffith, State Forester of Wisconsin, called recently at the office of the Secretary of the American Forestry Association. Mr. Griffith reports encouraging progress in the forestry work in his State. All legislation requested by forestry people was enacted by the State Legislature.

Meyer Bros., Shepherd, Michigan, are doing their share toward the reforestation of the country. This spring they set out 700 young pine, cedar and hemlock trees.

The City of Newark is very active in planting shade trees. The Commission has issued a diagram explaining graphically the requirements in regard to size of tree, manner of planting, and manner of protection. This

is sent to property owners in front of whose premises trees are planted, and their co-operation is solicited.

Another college that has added forestry to its instruction is the North Carolina College of Agriculture. The department of horticulture is now giving a course in forestry, under Prof. F. C. Reimer.

#### Should Let Trees Grow Bigger

Attention was lately called by *Arboretum* to the way farmers rob themselves when they cut down small trees. The writer says that ten years ago he saw in Virginia about thirteen thousand apple barrels held together by hickory hoops, to make which sixty-four thousand young hickory trees had been cut down. The barrel hoops had been sold for about four hundred dollars. If the trees had been allowed to grow they would have been big enough in a few years for cutting up into carriage spokes, and would have produced, at the present price of thirty-five dollars a thousand, spokes worth more than eight hundred thousand dollars. This is the kind of forestry argument that ought to appeal to owners of brush lots.

#### Another Adirondack Forest Grab

The plan to invade the New York Forest Preserve for commercial purposes has, happily, been defeated. The plan was to dam the streams and sell the power for private benefit. As this would kill the trees within the area flooded, it was contrary to the constitution, and the people of New York refused to consent to an amendment permitting such a perversion of their Adirondack woodland.

Now, another attack on the woods has been made and stopped by Attorney-General Jackson. The plan was to have county supervisors lay out roads through the Adirondacks; but the Attorney-General says: "The building of 'improved' roads through the wilderness would of necessity cause the destruction of large areas of valuable timber. It would be an easy matter for persons desiring to obtain



possession of timber lands to have any quantity of such lands 'acquired' by County Boards of Supervisors for the ostensible purpose of 'spoil banks,' sand beds, gravel pits, quarries, and other places wherever situated, and rights of way thereto, which could be subsequently sold when no longer needed. The State by this indirect method would then be divested of large portions of its forest preserve and of great quantities of timber which somebody had destroyed and removed. This statute, at least, affords a way by which the lands of the State in the forest preserve can be transferred to individuals or corporations who covet them, and of permitting the destruction and removal of timber thereon.

"But such roads cannot be lawfully constructed. No forest lands can be taken from the people, and no tree can be destroyed or carried away except by violation of the law, or through an amendment to the constitution."

Important as is the work which the State of New York is doing in conserving her Adirondack forests, she has not yet brought her policy there into line with forestry principles; for these demand not the maintenance, intact, of wilderness but the fullest utilization of the forest consistent with its continuity and the performance of its functions as a forest. The forester demands, and rightly, not only that the forest, as such, shall be conserved, but that trees fit to be cut shall be cut. If the Forest Service endeavored to do in the National Forests what the State of New York is actually doing in the Adirondacks, the attacks recently made upon the United States forest policy in the United States Senate and the Denver Convention would be but as the springtime zephyr before the cyclone. The reasons the people of New York have for maintaining their present policy they are, of course, abundantly able to state. If, in any event, they deliberately elect to hold their forests absolutely out of use it is, presumably, nobody else's busi-

ness. It should, however, be distinctly understood that this is not the policy maintained by the National Forest Service nor advocated by the American Forestry Association.

**Secretary Wil-** Hon. James Wilson, son **Inspecting** Secretary of Agriculture, is traveling through the West inspecting the National Forests.

Press dispatches indicate that he is not confining his inspection to glimpses from the window of a parlor car, but that he is tramping through the woods and mountains with a vigor and earnestness worthy of a younger man. The Secretary of Agriculture is one official who takes the duties of his office seriously.

#### **Scattering the Light**

The *Indiana Farmer* editorially calls attention to the fact that the Forest Service is conducting a campaign of education. It says: "The Forest Service has begun a commendable campaign of education toward the end of awakening public sentiment favorable to the protection, conservation and renewal of our native forests. The method adopted by the bureau consists in sending out, free of charge, all over the country, leaflets, pamphlets and bulletins containing interesting forestry information for the general public. We wish that the name of every farmer, land owner, and lumberman in the country could be placed on the mailing list for this instructive literature.

"The Forest Service is proceeding toward its purpose in a psychological manner. It is intended to create a friendliness through acquaintance with practical forestry, then when the suitable time has come the people will act in accord with the public interests, and the depletion of our forested lands will cease.

"Already we are seeing good results of this timely work directed by the enthusiastic Chief Forester, Gifford Pinchot. A number of States have developed good departments of

forestry and we are glad to say Indiana is one of these.

"Many farmers are becoming interested in the work and have voluntarily taken up tree propagation and growth. No one appreciates better the value of native trees for shade, beauty, and utility than the farmer, hence his pathway lies parallel with that of the Forest Service. It is up to him to advance in the same direction."

**River Improvement Convention** A river improvement convention is advertised for Memphis, Tennessee, October 4th to 8th. President Roosevelt is expected to be in attendance and to deliver an address on the opening day. The Inland Waterways Commission will be there. This Commission consists of Representative Theodore E. Burton, of Ohio, Chairman; Senator Francis G. Newlands, of Nevada; Senator William Warner, of Missouri; Senator John H. Bankhead, of Alabama; General Alexander Mackenzie, Herbert Knox Smith, Gifford Pinchot, F. H. Newell, and W. J. McGee.

The Commission will proceed from St. Paul, Minnesota, by steamer to Keokuk, Iowa, where, on the morning of October 1st, they expect to meet the President. The President will make the journey with the Commission on the joint invitation of governors of eight States touched by the Mississippi.

**Artesian Wells Pump Themselves** The flow from many artesian wells in the Virginia coastal plain is utilized to drive hydraulic rams for the purpose of lifting water to higher levels than the natural flow. Along the lower courses of the Potomac and Rappahannock and along the shores of the many inlets that run back from Chesapeake Bay, above the James, there are hundreds of artesian wells which thus pump themselves.

This ought to furnish opportunity for irrigation to fruit and truck gardens. Irrigation even in humid re-

gions has its uses. Intensive cultivation in a dry season is greatly helped by it.

**Enlargement of Hawaiian Forests** An addition has been made to the forest reserves in the Island of Maui by providing that the Government land within the limits of these reservations at present leased to private parties shall automatically, at the expiration of the present leases, become part of the forest reserves. The extent of the additions is about 23,000 acres.

In Hawaii even private lands in forest are sometimes administered by the Territorial Board of Agriculture and Forestry. Some of the lessees of public land within the Koolau Reserve, one of those just mentioned, turned over to the Board for administration both their leased land and their private lands in the same reserve, together amounting to 27,000 acres.

**Pennsylvania's Tree Growing Bounty** There is a law on the statute books of Pennsylvania which ought to have wide attention in Pennsylvania and wide imitation elsewhere. It is "An Act for the Encouragement of Forestry."

This law takes the best means possible to encourage owners of land to preserve and propagate timber trees, for it allows a reduction of taxes to the owner of land with young trees growing on it. The first man to take advantage of the new law is an Allegheny County farmer, Mr. Tenner, of Leet township. Mr. Tenner has obtained from the County Commissioners a reduction of \$22.50 on his taxes for complying with the provisions of the law.

In most States growing forests are taxed as heavily as though all the trees were ready to cut; and this happens year after year, so that the owner cannot afford to allow the trees to grow. This is one of the chief obstacles to the maintenance of private woodlands.

**Where Does Our Lumber Come From?** The production of lumber, lath and shingles in the United States in 1906 was the largest ever recorded. The Census shows no less than thirty-seven and a half billion feet, which is seven billion more than was reported in 1905. This, in the face of our waning timber supply, looks like an alarming increase; but, in fact, the apparent increase is due chiefly to the larger number of mills reporting, namely, 21,000 instead of 12,000. Because of a growing recognition of the importance of complete returns, more small mills are making response to the Census inquiries.

If the returns were complete they would probably show a cut of forty billion feet for lumber alone, which is, perhaps, 40 per cent of the total timber consumption. In view of the fact that the total amount of merchantable timber in the United States is believed to be less than two thousand billion feet, this is alarming. The West has enough timber to last fifty years if that section continued to use no more than now; but the West is developing; and, moreover, the East is already drawing on the West to such an extent that the railroads can hardly handle the traffic.

The position held by Douglas fir illustrates the situation. Douglas fir now ranks second only to yellow pine, and yields about half as much lumber. Never before has it outranked white pine. White pine was the lumber supplied by Michigan, Wisconsin, and Minnesota in the thirty years between 1870 and 1900, when these were the leading lumber States. In 1850 New York stood at the head in lumber production, in 1860 Pennsylvania. From 1870 to 1890 Michigan held first place; then, in 1900, Wisconsin. But in 1904 the primacy passed to the other side of the continent, to the State of Washington. Louisiana holds second place; and it is from the South, not the West as yet, that the largest part of our present supply, in the shape of yellow pine, comes. But, as was the white pine of the North, this

will be exhausted, and then the Pacific Coast will be the chief source of supply.

It is still the impression in some parts of the West that these regions are somewhat long on National Forests. This is a state of mind which the East is in a position to envy, since it has no National Forests at all.

**Fewer Sheep or None at All?** The Butte City, Mont., *Miner* quotes a stockman who says there are one million fewer sheep in that State to-day than there were twelve months ago, this difference having been brought about by the forest reserve policy of the present National Administration.

But if the range pastures are all eaten up, how is it possible to keep as many sheep as before? The Administration has not eaten up the grass; it is only protecting, for future use, such grass as is left, in order that the sheep population will not have to be reduced still more.

Gov. J. C. Cutler, of Utah, at the recent luncheon entertaining the Goddard newspaper correspondents' excursion, spoke wisely on this point: "It may sometimes appear that in seeking the greatest good of the greatest number, an injustice is done to some who are interested. This would appear in the case of setting aside certain forest reserves, to the detriment of lumber, stock, and sheep interests. Also in the withdrawal of certain mineral lands from entry under the present system, until the real value of these lands may be at least approximately determined. But it is easily seen that the disadvantage is only temporary. Because the first of these will result in the great increase of the water supply and in the growth of new timber and additional vegetation, the value of which will more than balance any temporary inconvenience. And as for the second case, the Government and the State should be entitled to a fair price for the lands they have to dispose of."

# THE NORWAY POPLAR, OR SUDDEN SAWLOG

(*Populus nigra*)

BY

C. S. Harrison, President of Nebraska Park and Forest Society

WE ARE very glad that in the May issue of FORESTRY AND IRRIGATION this tree was brought to notice. Here in York, Nebraska, we have a State Experiment Station, and it is part of our business to test everything that appears available for foresting our prairies. Having heard of this poplar on the farm of Emil Sahler, of Waseca, Minnesota, we secured a few cuttings some years ago, and the results have been astonishing.

The past winter I showed one-year-old trees in both Minnesota and Nebraska Horticultural Societies. They were from cuttings the size of a lead pencil planted last spring, and this winter were over nine feet tall. One specimen was two inches through at the base. Such a growth is phenomenal, when we consider the fact that last summer was very hot and dry, with only four inches of rainfall in the three summer months. I have some trees three years old that are twenty feet tall, and four inches through at the base. This tree does not, like many others, waste its energy in side limbs. It retains its size as it mounts upwards, and thus produces the largest amount of lumber material. It seems to lead every other tree in the rapidity of its growth, so we have named it the Sudden Sawlog.

I find no difficulty in getting the cuttings to grow without soaking in water. The best time to plant is just as soon as the frost is out of the ground. Of course, they do best in deep, rich loam.

The lumber is good and the fuel is excellent. It seems to split readily. Of course, the lumber would not be suitable for outside work; but for frames, roof boards, floors and sheeting there will be great demand for it. It is hard to forecast the price of lumber fifteen or twenty years from now. Already cottonwood planted twenty-five years ago is being sawed, and sells readily for eighteen or twenty dollars per thousand feet.

We are so well pleased with these trees, and so sure of their acceptance, that we planted about 20,000 this spring. We confidently expect a fair sized sawlog in fifteen years. As they increase so rapidly from cuttings they can soon be planted by the million.

There are waste places on the farm which should be put to work raising houses and barns. We are an impatient people, and want to reap a harvest in a year, but we can stretch our patience a little and plant in the hope of having a tree which will cut two to three hundred feet of lumber in fifteen years. Fortunes would have been made if the early settlers had planted cottonwood. Some lands planted thirty years ago prove to be worth a thousand dollars an acre now.

There are several plantations of these trees in Minnesota. Samples have been sent to Manitoba and Saskatchewan. The Norway poplar promises to be to the North what the eucalyptus is to the South.





## The Month in Government Forest Work.

**Geologic Work in National Forests** Fortunately, the United States Geological Survey, in connection with its other work in the West, has undertaken to examine geologic conditions in the National Forests. This will help in preventing the entry of mining claims for the sake of timber cutting. The Survey will require its geologists to assist in every way, however, the claimant who is acting in good faith, and to help the Forest Service in protecting the mining industry by the proper administration of the National Forests.

**Timber for New Mexico Mines** A study of the timber supply tributary to the mining camps of Mogollon and Cooney, New Mexico, has been undertaken by the Forest Service.

Every mine must have timber, and the large mines require immense quantities, for props, scaffolds, posts, and the overhead work to prevent the falling in of roofs, galleries, slopes and tunnels. The supply within reach of the towns of Cooney and Mogollon is thought to be limited, and every safeguard against waste is necessary not only to meet present needs, but also to secure a continuing future supply. If mining operations are to be permanent there, as it is believed they will be, timber must be had in years to come.

**The Chugach Forest in Alaska** A new National Forest, called the Chugach Forest, has been established in Alaska. It lies upon Prince William Sound on the south coast of the territory, and includes a large amount of coast broken by deep inlets and many islands. East and west it extends from the eastern bank of the Copper River to the western shore of the Sound, which is the eastern shore of the Kenai Peninsula. On the north it is bounded by the main divide of the Chugach Mountains, and on the south by the ocean. It comprises 4,960,000 acres. The supervisor is Mr. W. D. Langille, with headquarters at Ketchikan.

The timber in this forest is chiefly Sitka spruce, coast hemlock and Alpine hemlock, with some yellow cedar and cottonwood. The Sitka spruce is considered the best lumber.

The altitudinal range varies from 400 to 1,600 feet. The amount of merchantable timber has been roughly estimated at two billion feet, board measure.

A proclamation was signed by the President on July 20, eliminating about 11,878 acres from the Alexander Archipelago National Forest, Alaska. The eliminated portion covers that part of Kasaan Peninsula lying southeast of the Lyman anchorage, between Clearance Straits and Kasaan Bay.

### The Pole's Place in Timber Supply

In traveling over the country there is no more familiar sight than the long lines of telegraph and telephone poles flanking either side of the main highways. Not infrequently one sees a double line on either side. It is evident at a glance that each pole represents a tree and one is impressed with the thought of the immense forest that has been sacrificed to this wonderful invention of modern times.

Consider the numberless roads throughout the length and breadth of this country, the electric street railways, and the steam railway lines, and remember that on an average 40 poles are used for every mile of line. This gives some conception of the demand that is being made upon the forests for this purpose.

Just how many trees are now standing as poles along our highways will never be known, but according to statistics compiled by the Bureau of the Census and the Forest Service there are annually required at the present time  $3\frac{1}{2}$  million poles for the construction of new lines and the replacing of worn-out poles. This number includes all poles used by telegraph, telephone, electric light, and power companies, throughout the United States.

The average life of a pole is supposed to be about eight years, but since the pole decays fastest at the base, where it comes in contact with the ground, much can be done to extend its normal life by protecting this portion of it from decay. This is accomplished by treating it with creosote or some other preservative.

The bulletin issued by the Bureau of the Census and the Forest Service brings out some interesting facts. First, it shows that cedar alone furnished nearly two-thirds of all the poles used. This in itself is a striking point, since cedar is not a very plentiful kind of timber, and the supply comes chiefly from the Lake States, New England, Idaho, and Washington. In this respect it is decidedly unlike pine, for example, which is found

in almost every State of the Union; or oak, which is very widely distributed. Chestnut ranks next to cedar, and furnishes nearly one million of the  $3\frac{1}{2}$  million poles required. Pine, cypress, juniper, and redwood rank next, in the order given, while no other single one of the 100 commercial trees in the United States furnishes a number of poles worth mentioning.

### Addition to Santa Catalina Forest

The President has added to the Santa Catalina, Arizona, National Forest some 219,840 acres. The addition lies in Pima, Cochise, and Pinal Counties; the most important part is on the Rincon Mountains, which are covered with a magnificent growth of pine and an admixture of the rare Arizona cypress. It is expected that a good deal of trail building will be done this summer. The most important work at present, however, is protection from fires.

### Taxes From National Forests

The total receipts from the National Forests for the year ending June 30, 1907, were \$152,917.93, an amount double that of the preceding year. Of course this doubles the ten percent which goes to States and Territories in lieu of taxes. Eight States receive from \$13,000 to \$20,000 each, namely:

Montana .....	\$20,655.42
Idaho .....	19,122.92
Arizona .....	17,307.92
Wyoming .....	16,690.23
California .....	16,064.29
Colorado .....	15,791.67
Oregon .....	13,980.89
Utah .....	13,557.38

It will be noted that this list contains all but one of the States whose objection to the National Forests led to the abolition of the President's power to extend the forests in those States, namely, Montana, Idaho, Wyoming, Colorado, Oregon, and Washington. Only Washington is absent from this list of leading ones, the forests there being comparatively small.



**Grazing in the National Forests**

The annual report of grazing in the National Forests for the fiscal year 1906-1907, which has just been completed, shows that 6,657,083 sheep and goats, and 1,200,158 horses and cattle grazed under permit on the ranges. The previous year's totals were, sheep and goats, 4,263,100; horses and cattle, 1,025,148. The total receipts from grazing permits for the year were \$857,856.83. For the preceding year the amount was \$514,692.87. Stock is not pastured in all of the forests. In some regions cattle and horses predominate, in others sheep and goats.

The business relations between stockmen and forest officers, throughout the entire grazing region, have been pleasant and satisfactory. No serious trouble or misunderstanding occurred anywhere during the year.

**No Increase in Grazing Fees**

It has been announced by the Forest Service that no general increase will be made in the fees charged for grazing livestock in the National Forests during the present administration; though in the interest of fairness certain local adjustments will be made. Where an especially low rate was fixed on account of the crowded condition and consequent inferiority of the range, some increase in fees charged will be made as the ranges improve in condition.

**Grazing Improvement in Utah**

The allotment of cattle permitted to graze in Fish Lake National Forest, in Utah, has been increased 2,500, and that of sheep 5,000. Like other mountain ranges, pasture in Fish Lake Forest was formerly overcrowded and eaten to the ground year after year. The vegetation was given no chance to recuperate. Every stockman was trying to get the earliest and latest pasturage. Under the Forest Service administration overgrazing was stopped. The range immediately began to improve, with the present result.

**Study of Poisonous Plants**

Complaints of loss of stock by poisonous plants on National Forest ranges are being investigated this summer by the Bureau of Plant Industry, in co-operation with the Forest Service. Year by year, since earliest times, stockmen have suffered loss from this cause. The losses vary greatly. Sometimes the fatalities have been known to run as high as eighty per cent and yet again, over very wide areas, there is no loss at all. The subject demands study.

**Objection to Sheep in the Mountains**

Sheep being taken to their summer range in National Forests must frequently be driven through settled communities, to which the settlers object because the sheep devour the forage along the way and frequently damage the roads. The summer range in the Absaroka division of the Yellowstone Forest lies among the high mountains of the range and has been inaccessible except by the main Boulder Creek Road. A trail by another route was surveyed and partially completed, but heavy snow last fall stopped the work; and permission has been given for the sheep to go through on the main Boulder Creek Road, with as little annoyance to the settlers as possible.

A similar case is that in which the Gallatin Valley Club of Bozeman, Montana, protested against sheep grazing in the Gallatin National Forest, and requested that sheep started thither on permits already given should be turned back. The trouble here is that Gallatin Canyon is a summer resort. Pleasure camps are found throughout its length for fifty miles. Gallatin County built a road through the canyon at a cost of \$18,000. This Club aims to preserve the natural beauty of the place and make it a great resort. They point out that the use of camp sites for sheep corrals spoils their attractiveness. However, the protest came too late, as the sheep were already entering the canyon and could not be turned back without

great loss. The stockmen had paid for the mountain range and had no other. The protestors admitted that the sheep could not be barred this year without injustice. The trouble will not occur again, however, as the Government will see that another route is opened.

**Sundry  
Interesting  
Facts**

A thorough investigation just concluded by the Government shows that the bark peeled from willow twigs in basket making, and heretofore thrown away, has value for tanning purposes.

The atlas being made by the Forest Service as a record of practical work done, and as a basis for recording future work, has reached its fiftieth volume. This great book is not meant for publication but is open to any persons who wish to examine it or make use of the information contained in its 15,000 maps and the data gathered and recorded with painstaking care.

S. N. Spring has just returned from a trip through the West, devoted to studying tree planting on irrigated lands. He reports a wonderful development in the Snake River Valley of Idaho. That is a fine country for growing black locust. The borer pest is absent there.

E. S. Gosney, of Flagstaff, Arizona, is desirous of having all Forest Supervisors given power to summon witnesses and administer oaths. He holds that the sweeping powers of investigating and rendering decisions involved in administering forests require this additional power as a protection against action upon erroneous information.

It is reported from Centennial, Wyo., that Judge H. V. S. Groesbeck

has been retained by the miners of that district to carry into court the fight against the Forest Service's policy of not permitting miners to cut timber on claims located in the Medicine Bow National Forest. They assert that this policy is holding back the development of the district, and are determined that the order must be rescinded.

The fact that free use of wood from National Forests is allowed to settlers in limited amount is presumed upon by saw mill operators. Five mills, cutting without authority, have been stopped in Laramie Forest. The owners gave as an excuse that the lumber was not to be shipped, but sold near by. But this, of course, was not accepted as sufficient reason to relieve them from paying for the timber and complying with the Government regulations.

The Office of Co-operation reports keen popular interest in forestry, indicated by an increasing volume of correspondence from every State in the Union, asking for advice on tree planting and woods management.

Carl G. Crawford, Chief of the Division of Wood Preservation, is in Colorado to confer with people interested in the preservation of cross ties, posts, poles and structural timbers. In many respects conditions in Colorado are unusually well adapted for such work. Much timber is used there in mining.

James Stuart, a full blood, educated Nez Perce Indian, has been allowed to select five Indian assistants, with whom he is now in the heart of the Bitter Root National Forest, running lines for the Government. He is an expert civil engineer.



# THE DEBRIS FROM HYDRAULIC MINING IN CALIFORNIA

BY

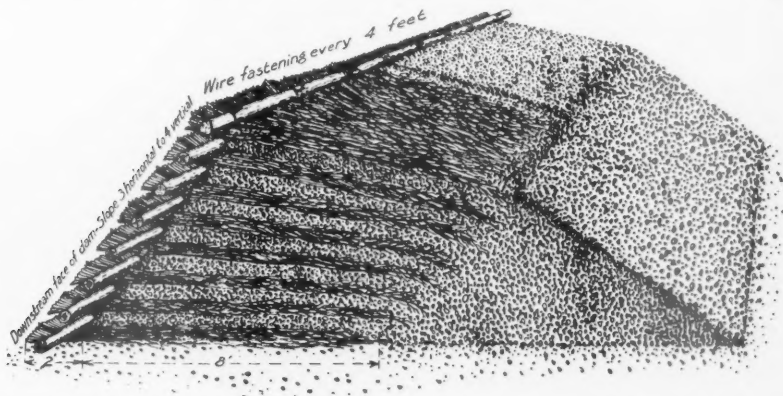
William W. Harts, Major, Corps of Engineers, U. S. A.

THE richness of the goldfields of California, discovered a generation or more ago, often seems almost fabulous. Scarcely a stream of the western slope of the Sierras but held in its gravel bed quantities of this precious metal. When these streams had been robbed of their treasure by the early miners, it was found that enormous wealth could be extracted from the old gravel beds of the rivers of the tertiary period. Thousands of men worked for years washing this gravel, and hundreds of millions of cubic yards of these ancient deposits were thus washed through their sluice boxes into the streams leading to the great rivers of the State.

This mad rush for gold at the expense of the future development of the industrial conditions of the valleys was aided in various ways by both the State and National governments, and little or no thought was then given to the injuries which might be caused later by these operations. But as the population of the valleys increased,

and the agriculturists found that the accumulation of mining debris was working incalculable injury to their farms by often covering their land with the deposit and by causing widespread overflow, a growing hostility arose toward the miners, who were believed to be responsible for such injurious conditions along the rivers. The hostility thus engendered grew to such magnitude that finally both State and Nation awoke to the seriousness of conditions, and for years engineers and legislators have been endeavoring to solve the Debris Problem.

The problem of what to do with the debris resulting from years of hydraulic mining, which still remains in large quantities in the upper rivers and in their mountain tributaries, and how to protect the valley farms from further injury due to the downward flow of this old debris, has been the subject of both State and National investigation, until finally an act was passed by Congress in 1893 providing for a Federal Board, composed of three engi-



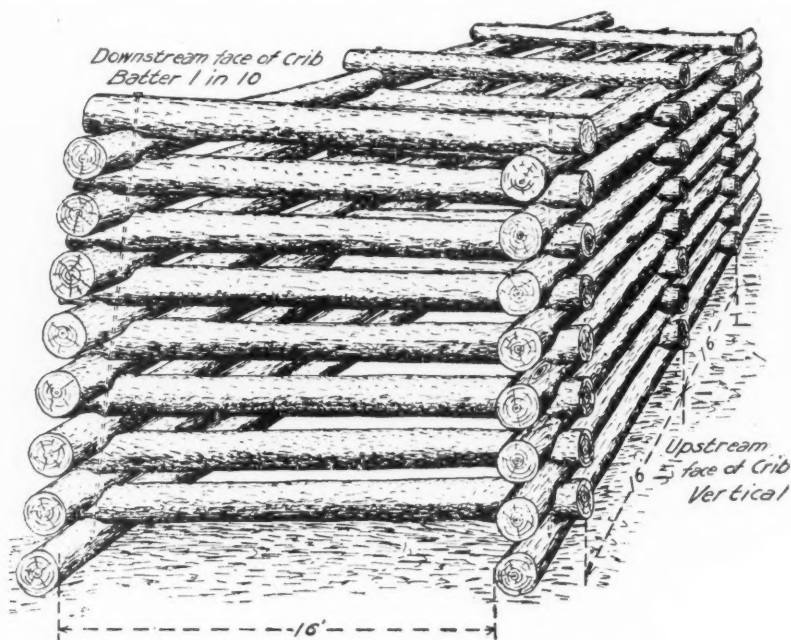
A brush restraining dam, with end cut away to show method of construction

neer officers of the army, to be called the California Debris Commission. This Commission found a condition for the improvement of which there was neither precedent nor previous experience, and everything had to be originated *de novo*, as no such condition exists elsewhere in the world.

Mining had been stopped by court injunction at the instance of the farmers of the lower valley. The Commission found the miners clamoring for

small mines. These two types of dam are now in general use for impounding debris for the protection of the low lands.

Of the two the log-crib is the usual type. It consists of a "cob-house" crib made of large logs which are notched and drift-bolted together. It is filled with quarried rock and chinked against leakage. The limit of height placed on these dams by the Commission for safety is forty feet.



Sketch showing two pockets of log crib dam, before chinking or filling

permission to resume mining; its first efforts were, therefore, directed toward an examination of the mines to see what relief could be afforded. It was found that the construction of dams in the canyons below the mines would, in most cases, provide for the storage of all the material that would be removed. After many years of study of the problem it was seen that either the log-crib dam or the brush dam would answer the purpose for all

The brush dam is constructed with strong, live brush, and may be twenty feet high, and at least ten feet long. These dams must comply strictly with the specifications of the Commission, and before beginning to mine, the hydraulic miner must obtain permission or license from the California Debris Commission, which is not given unless all the conditions specified as to dams have been complied with. In addition a monthly report is required by

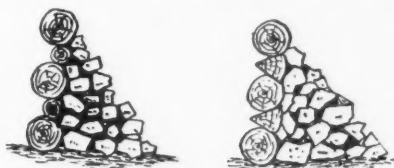
the Commission, showing the quantity of material mined, the amount of water used daily, and the conditions of the dams. Deputy United States marshals are also constantly employed inspecting the dams and mines to see that all the requirements are complied with.

Through the efforts of the California Debris Commission the debris from hydraulic mining is now so carefully regulated that very little is added to the old supply, and under the present restrictions the lower rivers are slowly improving. It is noticed that the Sacramento River is gradually lowering its low water plane at Sacramento, and the effect of the tide at this place is beginning to increase very perceptibly.

The other aspect of the duty of the Commission is the study of the rivers of the Sacramento and San Joaquin

overflowing and moving the large bodies of debris lying outside the walls.

It was decided to commence operations as early as practicable on the Yuba River, as this stream suffered more from mining debris than any other, and was doing more damage to the navigable rivers than all the others combined. The project as outlined by the Commission called for the expenditure of \$800,000, half of which was appropriated by the State and half by the National Government. The project provided first for barriers across the river just below Smartsville; second, a cut at Daguerre Point through which to divert the river at high stages, with settling basins for impounding fine detritus during the remainder of the year; and, third, training walls about 2,000 feet apart, extending from



Methods of chinking down stream face

systems in order that these navigable streams may be restored to their former condition as far as may be needed. The first step after controlling the output of debris from the mines was the treatment of the larger tributaries to prevent the enormous quantities of debris in their beds from reaching the navigable streams. A general line of work was first adopted on the Yuba River that, it was believed, would be applicable. This consisted of three divisions: (1) the construction of moderately high dams in the foothills to catch and store the heavy material that is deposited on high grades; (2) embankments and basins lower down to form settling pools for the finer debris; (3) training walls along the lower rivers to control the flow in selected channels and prevent the river from

Daguerre Point to Feather River to confine the flow to a selected channel. A dam in the Yuba was first tried by the State of California some years ago for restraining debris, on which work Mr. James B. Eads was consulting engineer. This was destroyed by the first high water—which, it may be said, is ordinarily greater than one-fourth the flow of Niagara Falls!

The first dam constructed by the Commission of brush, rock and gravel was washed out, and then a modified brush dam, made of brush fascines loaded with rock, was tried. This was all destroyed by the first high water. A stronger dam has now been constructed of piles, large rock and concrete blocks. It appears that this has solved the problem, as it has now passed safely through three high wa-



Looking across Yuba River dam



Face of Yuba River dam



ter seasons without injury and is the first dam to withstand a single freshet in the lower Yuba River. It has already stored over 3,000,000 cubic yards of debris.

The work of completing the project is now progressing rapidly. The diverting barriers and settling basin near Daguerre Point, together with the training walls lower down, are being constructed. This work has now progressed far enough to assure the Commission of its ultimate success, and to permit the Commission to study the other problems of the Feather and Sacramento Rivers, which is now being done.

Meanwhile a survey party has been kept in the field surveying Bear and American Rivers with a view to preparing plans for their treatment, either along similar lines or by some new project such as dredging. The Commission has recently examined the method of caring for the debris by dredging in the navigable rivers, and found it preferable to the settling basin method, at least for the treatment of the Bear and American Rivers. By dredging in the navigable rivers and removing the debris as it is brought in by these tributaries many incidental benefits may be achieved, now that the Yuba has been rendered

practically harmless. The navigation in the Feather River may be restored, that on the Sacramento improved, and the mining debris disposed of; and by placing the material along the banks in levees, the flood water will soon be controlled, and reclamation of the farms adjoining incidentally assisted. This will likely be the method recommended in all future work of the Commission. Should this plan be adopted by the State and Federal Governments it will probably solve the problem north of Sacramento. If this should occur, the attention of the Commission will then be turned to the problems of navigation and flood control in the Sacramento Valley.

Naturally it is impossible, in an article of this length, to go into details of the work that has been done and is contemplated. The California Promotion Committee, at Union Square, San Francisco, has all data relating to this work, and will answer questions on the subject. The California Debris Commission is solving questions and problems that have never before been solved, and the work already done and results accomplished are conclusive indications of the thoroughness and completeness of the plans that have been carried out.

#### USE WITHOUT ABUSING

I would not say to man: "Forbear  
To use the things God putteth here."  
But rather would I say to man:  
"Use in fruition of a plan;  
Take then these gifts God giveth thee—  
The golden fruit, the mighty tree,  
All pleasant things the fields produce—  
And render them to proper use;  
And, in return, one thing I ask,  
One simple, easy, proper task:  
That which from nature you efface  
With its own seedling life replace,  
And cherish all the gifts of God,  
To serve the ends of brotherhood."

# A DOMESDAY BOOK FOR OREGON WATERS

**I**N THE biennial report of Mr. John H. Lewis, State Engineer, to the Governor of Oregon (1905-1906) occur the following excellent recommendations:

## NEED OF LEGISLATION.

William the Conqueror found the titles to land in his kingdom in almost as great a state of confusion as appears to exist in the matter of definite

and in some counties the number of tenants, cottagers, and slaves, of all denominations, who lived upon them. He appointed commissioners for the purpose, who entered every particular in their registers by the verdict of juries; and after a labor of six years (for the work was long finishing), brought him an exact account of all the landed property of the kingdom. This monument, called Domesday



Irrigated farms in the Pacific Northwest—Ahtanum Valley, Washington

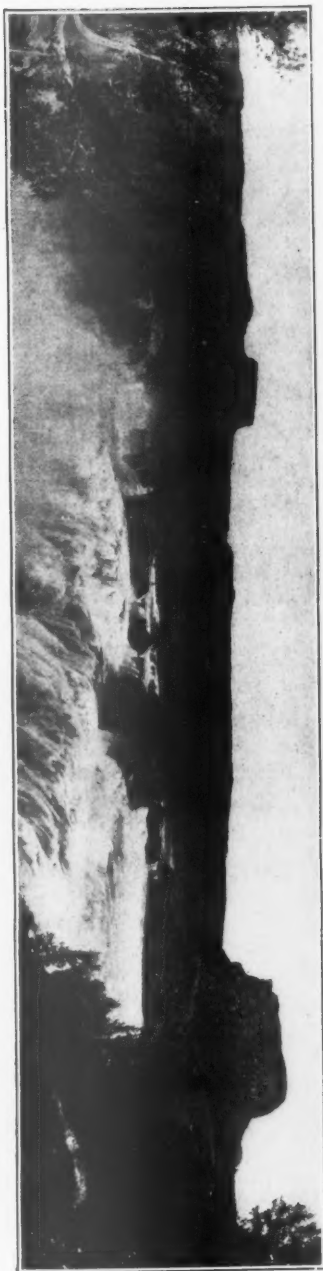
titles to water in Oregon. An important incident in his reign was the issuing of an order in 1085 to make "a general survey of all lands in his kingdom; their extent in each district; their proprietors, tenures, value; the quantity of meadow, pasture, wood and arable land which they contained;

Book, the most valuable piece of antiquity possessed by any nation, is still preserved in the Exchequer." (Hume, *History of England*, vol. I, p. 147.)

What we need in Oregon, briefly, is a complete record of water rights, or "A Domesday Book" on the subject of waters. We need surveys of water in



Lands in the Pacific Northwest to be reclaimed by irrigation

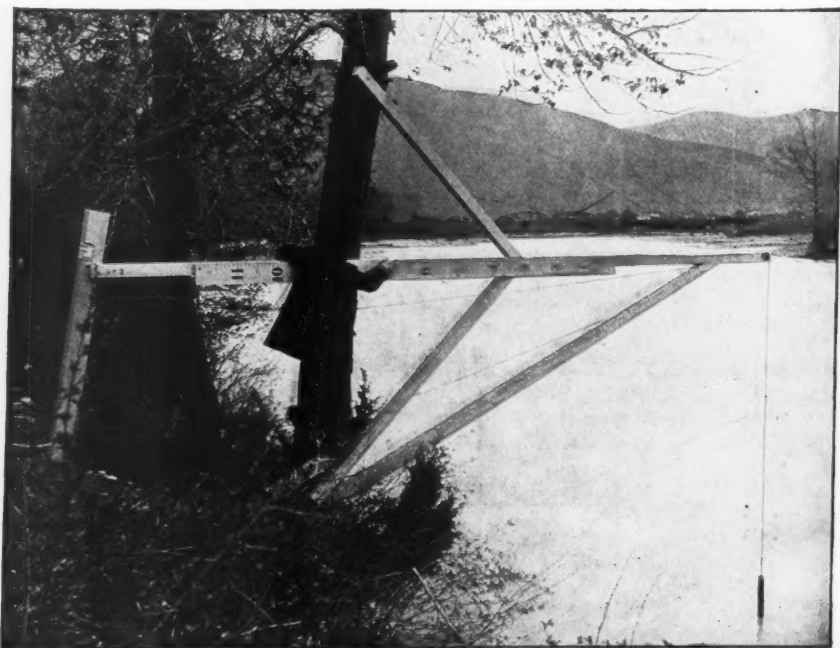


The water to do it with—Shoshone Falls

the streams of the State, or, in other words, water measurements extending through several seasons, to know the amount of our water resources, for the establishment of rights thereto and the granting of future rights. We need a record of vested rights as determined from such surveys and defined by legal procedure, giving the amount, priority, purpose, period, and place of use of the waters of this State. We need to know the amount of sur-

their relative elevation with reference to streams and possible reservoir sites, and to determine the location and extent of our water power resources; we need to know from actual experiment, the location and extent of underground waters and to what extent the great areas of central Oregon can be reclaimed by dry farming methods where water for irrigation is not available.

Owing to the complicated nature of our present statutory law on the sub-



A river gaging station—Measurement of water available for irrigation

plus or unused water in each stream available for future use, and a method of granting title to the use of such water. We need the extension of the police power of the State for the protection of vested rights in water when determined, and for the protection of the surplus water held in trust by the State for future users. We need topographic maps to show the areas of arid lands suitable for irrigation and

ject of waters, it has not been deemed advisable to suggest amendments to make this law meet the requirements of modern development and use of water.

It is recommended that a complete code of water law be enacted providing a definite system for establishing and acquiring titles to the use of water, for conveniently proving such title or claim of title in some central



Conveyance of water for irrigation—Tunnel to carry canal past a projecting spur

office where an abstract of titles or water rights can be readily ascertained, and for the protection by the State of all rights to the use of water.

If a modern code of water law is adopted and faithfully administered, with the assistance of the law-abiding element of each community, it is believed the following benefits will result:

Titles to the use of water will be as stable, definite, and easily ascertained as titles to land;

Present vested rights to the use of water will ultimately be defined and secured against encroachments, thus increasing their value;

Water right litigation will rapidly decrease, as but one general suit will be necessary, in place of constantly recurring litigation, as on present over-appropriated streams;

The money expended at present in almost useless litigation will ultimately be saved to water users;

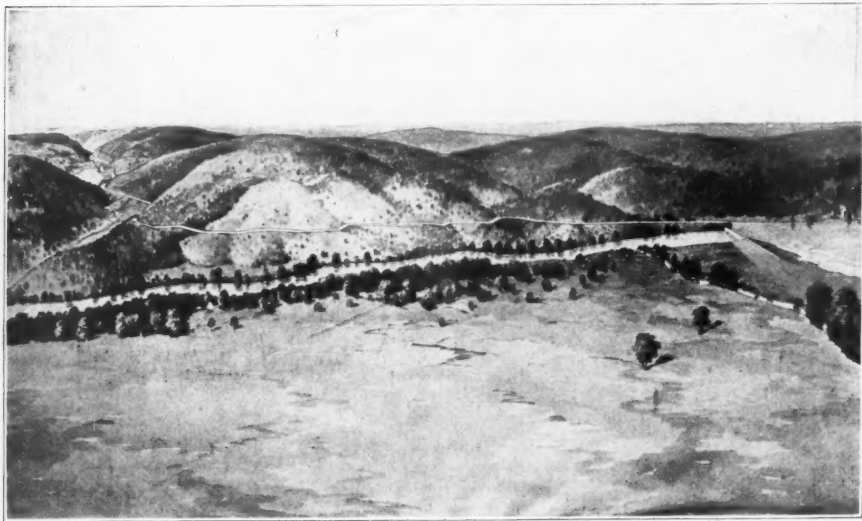
Information for investors as to water rights or unappropriated water will be easily obtainable;

Private capital will not hesitate to undertake feasible projects depending upon the use of water, as title to water and protection for a limited time will be granted by the State during the period of development of the enterprise;

The lack of a system of acquiring titles to water, or a convenient method of determining the amount of unappropriated waters in the streams of the State can not be urged by the Reclamation Service as a reason for not investing in Oregon its rightful share of the reclamation fund;

Much uncertainty as to water rights will be saved to settlers on lands reclaimed by the State under the Carey Act, and many of the difficulties of the construction companies in beginning and in making proof of reclamation will be eliminated.

Eventually the entire cost of a State administrative system can, by a proper system of fees, be borne, if necessary, by those benefited. With suitable legislation, it is believed that revenue could ultimately be derived from the use of the unappropriated waters of the State.



A proposed dam and canal—The canal takes its rise in the lake at the right, follows the hillside until it crosses the headwaters of a smaller stream in the background, then passes through hills on the left into another similar stream, which may serve as a natural canal



# A NATIONAL NEED

BY

Edwin A. Start, Secretary of the Massachusetts Forestry Association

**T**HE utility of the National Forests—which all lie west of the Mississippi—to insure the wood working industries of that section against the inevitable timber shortage due to our enormous consumption of forest products, is set forth very clearly in a recent press bulletin given out by the Forest Service, the general subject being the census returns of the lumber cut for 1906. The bulletin then says:

"The National Forests must be first

which will be needed. They will also have an influence in encouraging private holders of timberlands to take care of them in a way that will keep them in a productive state. The question what to do for timber that cannot be had in needed quantities is likely to become acute in the East."

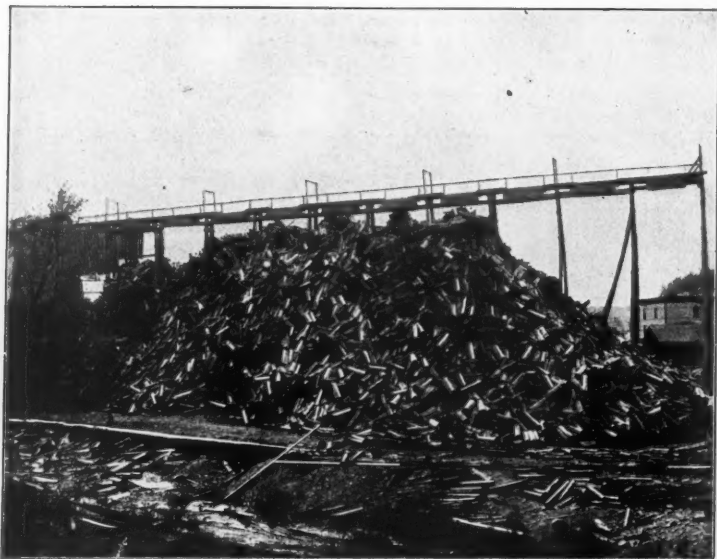
This is very true and well said. It should be noted, however, that the fact that the East has wasted its patrimony while that of the West is par-



What New England needs—A well managed forest—Large trees ready for market  
—Undergrowth sufficiently dense to protect soil

of all for the supply of Western needs. The East had originally the bulk of the country's forests. It has largely wasted them. The West has now a considerable provision for the future. The presence of the National Forests will insure for all time a permanent supply of material for wood-using industries in the West, although the actual holdings of the Federal Government are in themselves by no means sufficient to furnish all the timber

tially saved implies no merit on the part of the West as compared with the East. The West has been engaged in the wasting process as fast and as hard as was possible for a new country. Honestly and dishonestly the timber of the West was being turned over to private exploitation, imperiling both the timber supply and the water courses of that section, when the National Government, backed by a broad public spirit in the East as well as the



Where the woods are going—Stack of four-foot pulp-wood logs at the mill

West, intervened and took the measures which are now seen to be likely to result almost immediately in incalculable good to the West. These measures have been strenuously

fought by Western groups that are strong financially and politically.

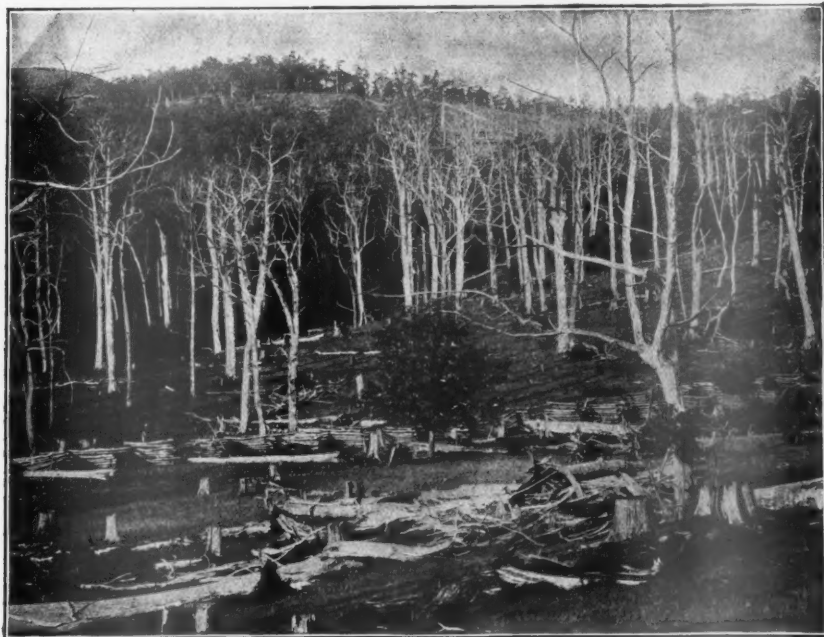
Now for the point of this comment. Whatever the East has done in the past with its own, it has made gener-



Lumber camp near North Woodstock, New Hampshire

ous atonement for any fault by giving its aid for the salvation of the West, and its interest in a great National property, the ownership of which it shared. Now the East asks that the West turn about and give like assistance in preserving some remnants of the splendid mountain forest domains east of the Mississippi, so that under National control they may be hereafter conserved and administered for

of the House. Of the members from the States now containing National Forests, only three voted with the East and South on the resolve appropriating \$25,000 for a survey of the Southern Appalachians and White Mountains, and several voted in the negative. The Central Western States furnished the bulk of the opposition. Under all the circumstances this may fairly be termed sectional



The South, too, suffers from lack of forest management—Here we have forest trees on mountain ridges killed by girdling in order to make pasture, and logs have been left to rot—Hard woods are becoming scarce, here is one of the reasons why

the good of the whole American people. This seems reasonable and just.

What is the answer? So far, the project for Eastern National Forests, supported by wise and public-spirited Americans of all sections, by the President, by the Senate, and probably by a majority of the House of Representatives, has been blocked largely by Western members, led by the Speaker

action, and not that broadly patriotic, generously considerate course to be expected of men whose rank in our political succession should raise them above the level of local politicians to the high place of American statesmanship.

Chancellor Kent laid down the principle in his classic Commentaries that when a representative has been elected

to Congress he is the representative not of his district, but of the whole United States, and this is good law to-day, although it is forgotten by too many men whose political vision is circumscribed by the limits of their districts. If this principle applies in the letter of the law, how much greater should be its force in spirit when our broad country has become so much a unit in all its larger interests.

supply is concerned the immediate value of the National Forests can be only local. The East is in far more need of this protection than the West, because it is the older country, and destruction here is more complete, while the local demand, because of the greater concentration of population, is vastly larger.

As this comment is based on the statistics of the lumber cut, nothing



Fallen and standing fire-killed timber, all ready for the next fire

The march of events, which the startling figures recently published by the Census Bureau have put in evidence, has already demonstrated the necessity of a system of regulated and protected National Forests to stand off the timber famine that is so nearly impending. Such a system should be truly National. The statistics make it equally clear that so far as the timber

has been said of the even greater question of interstate water courses, nor of the preservation of natural irrigation in great agricultural districts of the East. When these are considered it is clear that every branch of production and distribution is vitally concerned in this matter. How long is this just demand with its solid economic foundation to be unfulfilled?







# EFFECT OF A LATE SPRING FROST IN THE SOUTHWEST

BY

Frank J. Phillips, Forest Assistant, Forest Service

THERE is little definite knowledge concerning the relative frost-hardiness of American forest trees.\* Almost annually there come indefinite reports from various portions of the country concerning destructive injury to the forest growth by frost. A scientific record of such injury to various tree species would furnish an excellent basis for determining the relative endurance of different species on varying sites and of the same species in different localities, while in some severe cases such information might readily prove that this injury was the determining factor in forest succession. The following notes on frost action in New Mexico are compiled because of the absolute lack of published data on the region concerned and the dearth of information relative to most of the species affected.

The origin, duration, and extent of the storm are directly correlated to some extent with several distinctive features of the injury. The storm which caused this particular injury developed out of a low barometric condition existing over the whole of the lower Rocky Mountain region on April 17, 1907, which was backed southward and westward on April 18th by high atmospheric pressure coming in from the northern Pacific Coast region, causing a concentration in the area of the low barometer. The storm was considerably more severe in every way, except possibly wind velocity, from the Estancia Plains north and west, than it seems to have been

in the vicinity of Ft. Stanton, which was used as a center for the observations made upon forest growth. As far south as Carlsbad, N. Mex., and El Paso, Tex., the injurious effect seems to have been very slight. Though the climatology of New Mexico is characterized by annual snow storms in February, March and sometimes April,<sup>†</sup> this one is said to have been the most severe for April of any since the weather stations have been established. "A total of 48 inches of 'heavy, wet snow' for the period was recorded from northern Union County," while the conditions recorded at each weather station showed the storm to have been one of an unusual type.

The following table shows a general summary of the storm conditions at numerous weather stations in the vicinity of Ft. Stanton. The storm proper only lasted from April 19th to 21st inclusive, but a lower temperature was reported on April 22nd than during the three days previous, and this has been included in the table, as it undoubtedly had a material effect on forest growth.

The injury to the forest, on the whole, was peculiarly distinguished from that attending most spring storms by the fact that the injury to conifers was confined entirely to slopes with northern exposures, and, to a more limited extent, on exposed plains. Remarkable as it may seem, slope forests of conifers on other aspects were rarely injured even to the slightest extent. This is still more

\*There is an excellent general article, "Effects of Frost upon Forest Vegetation," by R. G. Zon, in "Forestry Quarterly," Vol 2, No. 1.

<sup>†</sup>Climatology of the United States; Dr. A. J. Henry. Bulletin Q, Weather Bureau, U. S. Department of Agriculture.

*Meteorological conditions—April 19 to 22, 1907.*

	MINIMUM TEMPERATURES				BEGINNING AND END OF PRECIPITATION			AMOUNT OF PRECIPITATION				UNMELTED SNOW IN INCHES			
	19	20	21	22	19	20	21	19	20	21	Total	19	20	21	Total
Alamogordo	48	33	33	25	During Night of 20-21			0	0	.20	.20	0	0	0	0
Alto	.....	.....	.....	.....	B-3 A M	.....	E-7 P M	.....	.....	.....	.75	.....	.....	.....	7.2
Artesia	No report	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cloudcroft	32	21	17	8	.....	B-4:30 P M	E-5 P M	0	T	.60	.60	0	T	6.0	6.0
Elk	41	28	26	23	?	?	?	T	?	.21	.21	?	?	3.0	3.0
Engle	No report	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Estancia	32	24	27	6	B-6 P M	E-?	.....	?	1.10	0	1.10	?	12.0	0	12.0
Fort Stanton	40	28	24	20	.....	B-6 P M	E-6 A M	0	T	.15	.15	0	T	1.5	1.5
							(?)								
Glen	40	32	30	26	During Night	2 A M to 7 P M	1 A M to 4 P M (E-?)	.05	.15	.32	.52	0	0	4.0	4.0
Hope	.....	.....	.....	.....	B-Dur. Night	.....	.....	.....	T	.50	.50	0	0	0	0
Lagunita	39	28	29	20	B-3 P M	.....	E-11 A M	?	?	1.14	1.14	?	?	12.0	12.0
Mesilla Park	50	48	37	22	.....	?	.....	0	T	0	T	0	0	0	0
Mountainair	32	22	21	14	B-P M	.....	E-P M	?	.62	.63	1.25	0	8.0	8.0	16.0
Orogrande	No report	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rincon	42	41	31	24	.....	?	?	0	T	T	T	0	0	T	T
Roswell	47	32	32	26	?	?	?	.01	.15	.48	.64	?	?	?	?
San Marcial	54	37	28	25	.....	B-9 A M	E-Dur. Night of 20	0	.60	0	.60	0	6.0	0	6.0
Socorro	39	27	15	25	.....	?	?	0	.98	.12	1.10	0	?	?	11.5

B—Beginning. E—Ending. T—Trace.

Table compiled by R. M. Harding, Acting Section Director, Santa Fe, New Mexico.

remarkable when consideration is given to the fact that north slopes usually escape frost in spring because of the retarded growth, while trees on such slopes sometimes suffer from early fall frosts because of incomplete lignification. This particular instance can be explained only by the fact that the storm in coming from the north had a more severe effect on such slopes and that the north-slope coniferous forests were at the most tender stage of the spring growth, while similar forests on other slopes, being further advanced in seasonal growth, were beyond the danger point of a storm no more severe than the one in question. Most of the deciduous forest trees were injured on all slopes, but more severely on those with northern aspect.

The frost action extended to the base of the subalpine zone, which ex-

tends above an elevation of 9,000 to 9,500 feet, and as a rule there was a distinct line between the injured and uninjured individuals. This distinct line was undoubtedly caused by the fact that the trees at higher elevations had not yet started spring growth. In all species the damage increased proportionately as the elevation decreased. This was noted particularly in the greater number of trees injured at the lower levels; and was largely due to the fact that more trees had started growth at these levels than near the upper altitude limit of the frost-action.

Throughout the study it was readily apparent that the Capitan Mountains, extending from east to west for a distance of approximately twenty-one miles, with an elevation of 7,000 to 9,100 feet, and the Tucson Mountains, eight to ten miles in length and

of about equal elevation, served as an excellent protective barrier for the forested area lying to the south. Since there was a wide variance in the effect of the storm on opposite sides of these mountain barriers, each tree species will be considered separately and with special reference to relative injury in the two geographical situations. In several cases individual mountains furnished a protective effect of a similar nature, but it was too limited in extent to be considered separately.

#### RED FIR (*Pseudotsuga taxifolia*)

This species occurs principally from 7,000 feet to 9,500 feet elevation. The trees at low elevation were worse affected than those at a maximum elevation. South of the Capitan Mountains only the reproduction was affected, and usually no trees over fifteen feet in height showed injury. Two sample areas of one-fourth acre each showed, respectively, eighty-three and ninety per cent of all trees less than ten feet in height with their entire foliage killed. Within eight days all of this reproduction showed new growth at the tips of branches; and within sixteen days only exceptionally rare specimens were found which had not sent out new growth and showed signs of ultimate recovery.

North of the Capitan Mountains the reproduction was affected similarly to that already mentioned, although the effect was slightly more severe and the trees required a longer time for recovery. The tips of branches on mature trees north of the Capitan Mountains were visibly affected; several instances being noted where trees three feet in diameter and over a hundred feet in height were affected at the low elevation.

This was the first coniferous species to show signs of recuperation.

#### WHITE FIR (*Abies concolor*)

The white fir showed results very similar to that of the red fir, excepting

that it recuperated very slowly. It grows fully as low in elevation as the red fir, but did not show as severe an injury. No white firs were noted north of the Capitan Mountains, and consequently no comparison can be made with the effect on mature red fir in that locality.

#### LIMBER PINE (*Pinus flexilis*)

Limber pine was affected worse than any other coniferous species. Practically all the reproduction south of the Capitan Mountains up to a height of fifteen to twenty feet had its foliage killed or seriously weakened by the frost, while even mature individuals frequently showed dead foliage on the tips of branches. In no case were specimens under five feet in height found with live foliage. North of the Capitan Mountains the injury was proportionately greater, and similar to that which has been recorded for previous species.

This injurious effect to the limber pine seems remarkable when consideration is given to its growth as a timber-line tree both in New Mexico and further north on the most enforced, exposed sites, where the growing season does not last more than three to five months, and where killing frosts may be expected each month. This species is adapted to a wide range of soil and climatic conditions, but the effect of this storm would seem to indicate that it was more susceptible to injury from cold at low elevations than at high ones.

#### BULL PINE (*Pinus ponderosa*)

Owing to the fact that bull pine is the principal coniferous species at moderate elevations, a greater number of individuals of this were injured than of other conifers. South of the Capitan Mountains most of the injurious effect was noted on trees less than six feet tall, though occasional individuals up to twenty feet in height showed frost effect at the tips of branches. North of the Capitan Mountains the average height of the

affected individual was at least five feet greater, while frequently the tips of branches on mature trees were visibly affected. An extremely large number of blossoms were killed on trees to the north of these mountains, while such an effect to the south was noted on only eight individuals. Individuals growing on small isolated hummocks, those injured by fire, and those affected by false mistletoe, were worse affected than stronger trees. The bull pine gave little or no signs of rejuvenation one month after the storm; but a small sample plot of those trees with dead leaves showed only twenty per cent having a black sapwood and giving signs of being completely killed. Undoubtedly most of the affected trees of this species will recuperate during the rainy season of July and August. A plantation of 1,000 four-inch bull pine seedlings was made April 4th and 5th, and set out on a north slope at approximately 8,000 feet elevation. This was located on a planting site considerably south of the Capitan Mountains, and received fair protection, but had at least two-thirds of the individuals killed.

#### PINON PINE (*Pinus edulis*)

The pinon pine did not show injury so quickly as the other coniferous species, probably because of the thick epidermis of its short leaves. On two north slopes between Capitan, N. M., and Nogal, N. M., where the Capitan Mountains did not serve as a barrier and where the pinon was exposed to the full force of the storm, at least ninety per cent of the reproduction up to four feet in height had the leaves killed outright, while numerous individuals of this species of a larger size were seriously affected. North of the Capitan Mountains the injury was more widespread and affected larger trees than to the south, often one-third to one-half the foliage being killed on outer branches of mature trees. As this is a surface rooting species which grows in the open, it was undoubtedly worse affected than some

of the deeper rooted species with less exposed crowns.

#### ONE-SEEDED JUNIPER (*Juniperus monosperma*)

This species was not affected south of the Capitan Mountains nor on moderately protected sites north of these mountains. However, on the most exposed sites in the plains type of forest, numerous cases were noted where the reproduction up to three and four feet in height had dead foliage and black sapwood. This was especially true where the individuals were growing singly or in very small groups. It was also noted on those trees of small size which were badly affected by false mistletoe.

#### ALLIGATOR JUNIPER (*Juniperus pachyphloea*)

Only three individuals, all of which were less than ten feet in height and north of the Capitan Mountains, showed any injury. Even on these few trees the injury was very slight. For the range of elevation over which this tree thrives, it is undoubtedly the most hardy coniferous species in the region.

#### SPRUCE AND FIR (*Picea engelmanni* and *Abies lasiocarpa*)

Individuals and stands of these species occur at a higher elevation than the line to which the frost injury extended, and hence were not injured.

#### SCRUB OAKS (*Q. gambelii* and *Q. undulata*)

These species, of which *Quercus gambelii* predominates, cover a larger area than any other single species in the region, and were universally affected on slopes of all aspects, though most seriously on north slopes. North of the Capitan Mountains a large number of specimens had black sapwood, and frost cracks from one to two feet in length were common; while south of the mountains no frost cracks were found, and only a few specimens



A contraction frost check—Trunk of spruce split up one side



An expansion frost check (the crack parallel to circumference)  
opened to the surface by a succeeding contraction check

had black sapwood. Owing to the fact that most specimens of these species have had their tops severely cropped back by grazing from cattle and thus have a remarkably large root system compared to the size of the top, they were injured to a smaller degree than large specimens of the same species which necessarily have a proportionately smaller root system and more exposed tops.

The larger individuals of scrub oak show a greater variation in the second crop of leaves than they did in the first crop. This, to a limited extent, is undoubtedly due to a weakened vitality and the death of a few branches; most of the effect, however seemed to be due to the stimulation of adventitious buds. There was less irregularity in the small specimens, since most of the adventitious buds had been previously stimulated to growth by several years grazing and few of this class of buds remained to be affected by the frost.

The scrub oaks commenced to put out a second crop of leaves May 15th to 20th, and almost all individuals showed signs of recuperation by June 3d. The stands on north slopes recovered somewhat more rapidly than those on south slopes, which was probably due to greater moisture content of the soil and a more favorable temperature for recuperation.

#### NEW MEXICO LOCUST (*Robinia neomexicana*)

At the time the storm occurred no individuals of this species had started growth above an altitude of 8,500 feet and only a few trees had started growth above an altitude of 7,500 feet. This species is confined to north slopes and valleys. On the north slopes at low elevations it was severely injured, causing the death of leaves and young shoots. Reproduction up to six or eight feet in height was killed back to the ground, but all such trees showed great recuperative power by sending up numerous sprouts from the base. Frequently eight or ten sprouts were

noted on trees no more than six feet in height.

#### NEW MEXICO WALNUT (*Juglans rupestris*)

This species is almost entirely confined to stream courses, and because of the ameliorating influence of the water did not suffer as severely as it otherwise would have. At the time the storm occurred the leaves were about half formed and the flowers were from one-half to fully formed. Leaves and flowers were completely killed, and in rare cases the sapwood became black.

By May 18th the second seasonal crop of leaves and flowers began to appear. No material difference could be noticed in the second crop of leaves compared with the first. The dead blossoms were mostly retained and a direct comparison could be made between the first and second crops. As a general rule the blossoms were less profuse than they were during the first blooming period, and in several cases seemed to be smaller individually. On a few trees, however, the storm seems to have had a stimulating effect by increasing the number of flowers and also increasing their size above that which is normal.

#### POPLARS (*Populus*)

All species in this genus were moderately hardy compared with other deciduous trees. *Populus angustifolia* and *P. fremontii*, which border stream courses, had very few leaves entirely killed. However, most of the leaves were frost-bitten on one side, and in recovering showed a peculiar curly appearance due to inequality in rapidity of growth. The leaves on these species at the time of the frost were from one-third to one-half fully formed.

*Populus tremuloides*, which occurs in dense slope stands up to high elevations, was considerably worse affected because subjected to more severe storm effect. This was noted



particularly on north slopes at moderate elevations. On high slopes where the trees had not yet started no effect was apparent. In direct comparison with the two previous species, all leaves that had started on this species were killed. The trees showed great variability in starting growth, hence several individuals at low elevations which had not started were uninjured.

#### ASH (*Fraxinus velutina*)

Only a few specimens of this species were found. The leaves were about one-third formed and all were completely killed. The sapwood turned black. Undoubtedly this species has little resistive power compared with other deciduous species.

#### BOXELDER (*Acer negundo*)

Boxelder occurs mostly along the stream courses and had started growth very limitedly at the time the frost occurred. Very few leaves were affected and no sapwood had turned black. It is one of the most resistant trees to frost action.

#### MAPLE (*Acer saccharum grandidentatum*)

Only a few trees of this species had started. The injury was confined to partially killed leaves.

#### CHERRY (*Prunus serotina*)

This tree grows in low, moist situations bordering stream courses. Only a very few of the trees showed slight injury to the leaves, although a large number had started growth. It is undoubtedly one of the hardiest of deciduous trees in the region.

#### FALSE MISTLETOE (*Phoradendron juniperinum*)

Several cases were noted where false mistletoe had been killed upon both the alligator juniper and the one-seeded juniper without any injury resulting to the host trees themselves. The most remarkable case seen of this

was a one-seeded juniper tree, fourteen feet high, with a crown twelve feet broad, which contained ninety-six well-developed bunches of mistletoe; thirty of these bunches were killed outright and nineteen more showed visible effects of freezing. The worst affected bunches were in most cases on the outer portion of the tree. The fact that the parasite was injured and the host uninjured was undoubtedly due to the fact that the parasite is composed of less stable tissue, and hence is less resistant.

#### UNDERBRUSH

Underbrush which grows in the open, such as the catsclaw, etc., was badly affected by the frost both south and north of the Capitan Mountains. Since the species have thick leaves, they were relatively less injured than some of the tender-leaved deciduous trees. In no case, however, did the mountain mahogany show any injury.

#### FRUIT TREES

Practically all fruit trees of apple, pear, and peach, which were set out within the past two seasons, were killed outright. Numerous mature individuals were also killed. Cherries were the least affected and were the first fruit trees to show signs of recuperation.

The relative endurance of the various species is shown in the following table, in which the least resistive trees are placed first:

CONIFERS	DECIDUOUS TREES
Limber pine	Ash
White fir	Mexican walnut
Bull pine	Scrub oaks
Pinon pine	New Mexico locust
Red fir	Catsclaw
One-seeded juniper	Aspen
Alligator juniper	Narrow-leaved cottonwood
	Fremont poplar
	Maple
	Boxelder
	Cherry
	Mountain mahogany.

In all cases where reproduction of the injured species was growing under a dense overstory the injury was much slighter than it was for the same species growing in the open, and often it was not even apparent. Numerous cases were noted where a single mature tree of pinon, juniper, or red fir, especially with low branches, had protected the tender reproduction growing beneath from all injury.

A more severe storm or one at a different period of the year might not cause the same relative injury. Thus red fir, which is classed as third among the conifers in relative resistance, in a more severe storm might not have showed the remarkable recuperative powers shown after this storm, while a fall frost might readily have produced an entirely different effect. Since this season was cold and backward a similar storm in a normal season would produce an effect at considerable variance with this.

The worst effects of the storm were a general check in forest growth and the death of a small percentage of the smallest coniferous reproduction. The killing of the scrub oak foliage caused an economic hardship on cattle owners, since this species is extensively relied upon for forage during April and May, and several cattle died from lack of this food. The total effect upon the forest would have been much more serious than it was if it had not been for warm rains during April and May, preventing the death which the characteristic drought of the Southwest would have caused to the weakened trees.

#### SUMMARY.

1. Physical barriers and dense overstory furnish decided protection against frost injury.
2. Trees in open stands were affected more than those in dense stands.
3. The formation of a distinct line between the zones of injured and uninjured trees was due to the

frost affecting only the trees which had started growth.

4. Young growth was injured more severely than mature trees.
5. Weak trees were worse affected than strong ones.
6. Thin-barked trees, as a rule, suffered more than thick-barked ones.
7. Conifers were more resistant than the deciduous trees which had started seasoned growth.
8. Direction of wind has a direct influence on the degree of injury to stands occurring on slopes of different aspects.
9. Within the zone of frost effect the injury increased proportionately as the elevation decreased.
10. Limber pine, which is one of the hardiest trees at high elevations, becomes less hardy at low elevations.
11. Trees growing on small mounds were more severely injured than those growing on level land.
12. Adventitious buds were stimulated on scrub oak trees, causing a more variable second crop of leaves than on those trees where adventitious buds had been previously stimulated by grazing.
13. Frost increases the sprouting of *Robinia neo-mexicana*.
14. Frost kills blossoms on both deciduous and coniferous trees, and undoubtedly has a material effect in reducing the seed crop.

---

(A report from the Las Animas "National Forest," in August, states concerning the western yellow pine, red fir, and Engelmann spruce, that the "heavy snow storm of April, 1907, seems to have stopped the growth of all cones for this year, and very few cones for next year's crop are coming out." Further observations on the effect of this or similar storms would be of value to the Forest Service.—F. J. P.)

# FOREST PLANTING IN CONNECTICUT,

1907

BY

Austin F. Hawes, State Forester

IT MAY BE of interest to the readers of FORESTRY AND IRRIGATION to know something of the recent awakening of interest in forest planting in Connecticut. Last year I published in *Forestry Quarterly* an account of the spring planting in this State. The spring of 1906 was the first year that there was any extensive planting by private owners, the number set being about 100,000 seedlings in all. The spring of 1907 has seen a marked increase in this line, 350,000 seedlings having been planted.

We have now a nursery started in which we are raising about half a million seedlings that will be ready for use next spring; but up to the present we have been obliged to import all our stock from outside nurseries. Bids were obtained in January from all the large nursery companies for 100,000 white pine two-year seedlings and three-year transplants. R. Douglas' Sons gave the most satisfactory offer of two-year seedlings, \$3.85 per thousand (\$3.75 was paid D. Hill last year). An order was given Douglas' Sons for 165,000 seedlings. Frederick Kelsey, of New York, offered three-year transplants at \$5.45 per thousand. As Kelsey was not sure that he could supply the total number of three-year transplants required, an order for 105,000 was placed with him on the condition that the balance be filled with two-year seedlings at \$3.85. After this order had been given, word was received from the State Forester of New York, stating that he had a surplus of two-year seedlings which we could have for \$1.50. Some 30,000 of these seedlings were therefore ordered. Small lots of other species

were also secured, so that in all this office ordered:

195,000	two year white pine seedlings.
105,000	three year white pine transplants.
15,000	two year Scotch pines at \$3.75.
10,000	two year Norway spruce at \$2.00.
325,000	total.

An offer was made to land owners of the State to sell this stock to them at the same rate, plus the cost of express, in lots of 1,500 or more. In this way they were able to get a small number of seedlings at wholesale rates, less than one-half the cost which they would otherwise have been obliged to pay.

The disposition of the stock was as follows:

State land.....	35,000 white pine 5,000 Scotch pine 3,000 Norway spruce
Private owner, Union .....	75,000 white pine 3,000 Norway spruce
Private owner, Middlebury ....	85,000 white pine 2,000 Norway spruce
An educational institution, Windsor .....	20,000 white pine 10,000 Scotch pine
Private owner, Farmington ...	21,000 white pine
Eighteen other private owners in various parts of the State.....	64,000 white pine 2,000 Norway spruce
	325,000 total

Besides this purchased stock, 15,000 home-raised seedlings were planted on the State land, and 10,000 on land belonging to the Experiment Station, making a total of 350,000 trees.

The expense of planting depends entirely on the character of the land and efficiency of the labor. We do our planting with crews of four men, three planting with mattocks and one supplying the trees. On good open land a crew of this kind will average over 4,000 trees a day, *i. e.*, 1,000 trees per man per day. Some of the men have averaged 1,100 trees per day. The slowest land to plant is very stony land, which takes longer even than sand plain covered with brush. On such land as this some of the crews have not averaged over 500 trees per day per man.

In planting the State land in Union most of the laborers employed were American farmers, whom we pay \$1.75 per day, the foreman getting \$2.00. On this job 50,000 two-year-old trees were planted at \$1.69 per thousand. There is less difference between the time required for one crew to plant two and three year stock than there is between two crews planting the same kind of stock.

#### Summary of expense:

1,000 two-year seedlings.....	\$3.85
Transportation .....	.26
Planting .....	1.69
Cost for 1,000 .....	\$5.80
Planting 5x6 feet, 1,500 per acre	
Cost per acre .....	\$8.70

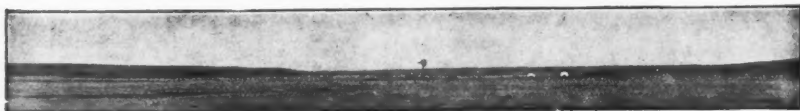
When trees can be secured at \$1.50 per thousand the cost of planting per acre may be reduced to \$5.12. On the other hand, for planting very stony land, or land covered with brush, the additional cost of labor often brings the total expense up to \$10.00 or even \$12.00 per acre. The only advantage of three-year transplants is that they get an earlier start, and therefore make more of a showing the first few years than the two-year seedlings. Many owners are anxious to have their plantations show at once. Cost

of planting per acre, with trees costing \$5.45, ranges from \$11.00 to \$15.00 per acre.

Of the stock purchased this year, that furnished by Kelsey, which came from Europe, was the best appearing and will probably do best. However, the other lots were as satisfactory as purchased stock usually is. Purchased stock imported from a distance is never so satisfactory as that raised at home and planted near the nursery. Examination of last year's plantations made with Illinois seedlings shows that 85 per cent have lived, which leaves about 1,275 trees per acre, sufficient for practical purposes.

While the planting of 350,000 trees, or scarcely over 200 acres in a whole State, seems in itself a trivial matter, the encouraging feature of it is its evidence of awakening interest in the subject. When these plantations, scattered over the whole State, have reached the height of a man's head, they will attract much attention, and it is safe to prophesy that within the next decade forest planting in Connecticut will require millions rather than thousands of trees.

The actual monetary value of 200 acres of pine plantations, however, is not to be despised. Stands of white pine in this region fifty years old, commonly yield 40,000 feet per acre. With stumpage at \$6.00 per M. as at present, this would mean a product in fifty years worth \$240 per acre, or on the whole tract eight million feet, worth \$48,000, as a result of a present investment of about \$2,000. According to Connecticut laws these plantations will only be taxed thirty years of the whole fifty. As stumpage will probably be much higher, the profits may be expected to considerably exceed those above indicated.





## Government Irrigation Work During the Month.

**Reclamation So Far Completed** The Reclamation Service now has an aggregate of 280,000 acres under water. It will have more than twice that quantity next year. No new projects are being undertaken at present, but work is progressing steadily toward the completion of those in hand. In the Minidoka, North Platte, and some other projects the water is not being used this summer, because the farmers were unable to believe that it would actually be available so soon, and they have not prepared their farms to receive it.

**Umatilla Lands Released** The development of conditions under the Umatilla irrigation project, Oregon, having reached a point where it has been ascertained that certain lands are no longer essential in connection with the project, more than 62,000 acres of land have been restored to the public domain. These lands will be subject to settlement on such date and after such notice by publication as the Secretary of the Interior may prescribe, and shall be subject to entry, filing or selection upon the expiration of thirty days from such date.

**The Jack Rabbit's Country Growing Rich** "The West is enjoying a full measure of the National prosperity," said C. J. Blanchard, Statistician of the Reclamation Service, who has just returned from an extended visit to the Government irrigation projects.

"The Great Plains present the appearance of a vast hay meadow, and the stockmen are jubilant. The Great American Desert is undergoing a transformation not dreamed of a few years ago. Distant rivers have been brought to it, and about ten million acres of the land that Daniel Webster declared fit only for the jack rabbit and the rattlesnake are yielding annually \$150,000,000 in crops.

"Nebraska, from Omaha to Scott's Bluff, is one great garden. Crops never looked better, and evidences of prosperity are seen on every hand. Omaha is assuming metropolitan airs and business is booming.

"Montana is coming into her own. Settlements are dotting the eastern part of the State, so long given over to the range. The irrigated valleys are rapidly filling up, and they are beginning to talk about a million people at the next census. The mining industry is in a healthy condition and the output is heavy. Sheep raising is making millionaires, and cattlemen are not complaining.

"Northern Wyoming is on the eve of big development through the initiation of several large irrigation enterprises—Government and private.

"Utah has struck oil, literally and metaphorically. Down in southwestern Utah the drills have encountered a fine grade of illuminating oil, and prospectors are rushing in. A number of rich strikes in the mines near Salt Lake have put a lot of folks on Easy Street. Salt Lake City, one of the finest cities in the world, is growing

rapidly, and is destined to become great, as the resources of that section are developed."

**Towns in the  
Huntley  
Project** Beginning September 3d the Government will

sell off lots in the new townsites in the Huntley project, Montana. This tract was opened to settlement in June, and the 631 farms are practically all taken. It now remains to start the towns which will do business with this new farming country. There are to be eight towns. The selling will be at auction, probably beginning with Huntley, at the western or upper end of the tract. It is the policy to sell only a portion of each site, so that the town will be built compactly; then more will be sold in later years when needed. No lot will be sold for less than a previously appraised value, but it will go to the highest bidder above the appraisal.

This territory was an Indian reservation before reclamation, hence there were no towns already started, and it is possible now to locate them in the most convenient manner. No farm is over two and one-half miles from town, and every town is a station on a transcontinental railroad. There are two railroads, the Northern Pacific and the C., B. & Q. This ideal distribution will make it possible to have

every school district center in a village, and there is talk already of having daily stages to carry children to and from school, as is the practice in some other rural sections.

The people inhabiting this new farming territory are of excellent quality. The Secretary of the Interior, the Director of the Reclamation Service, and other high officials were present at the opening in June; and it was the general observation that the settlers were above the ordinary in intelligence and character. This is partly due to the fact that irrigation farming requires more ability than more primitive types of agriculture, and this fact is becoming generally known. These settlers are largely from the Middle West, and many have families.

A few farms still remain, because some of those who drew lucky numbers were not serious in their intentions; but those next in order, who are entitled to enter upon them, will doubtless do so soon, and by spring there will not be an acre left. Many improvements are already made.

The names of the new villages are as follows: Huntley, Osborn, Worden, Cartersville, Pompey's Pillar, Bull Mountain, Ballantine, and Anita. The only one located before the reclamation was Huntley, which was a railroad station.

### THE TORRENT

And oft both path and hill are torn,  
While wintry torrents down are borne,  
And heap upon the cumbered land  
A wreck of gravel, rock and sand.

---

Accuse not Nature,  
She hath done her part:  
Do thou but thine.

---

The world is too much with us; late and  
soon.  
Getting and spending, we lay waste  
our powers;  
Little we see in Nature that is ours.  
William Wordsworth.





**Indiana State Board of Forestry.** Sixth Annual Report. This cloth-bound, illustrated volume of 200 pages begins with a preface concisely stating what is needed for forest improvement in Indiana. After reporting the work accomplished in the State forest reservation, articles are given on various forestry topics, especially on growing young trees, and on taxation of forest lands. The conclusion is reached that taxation should be such as to encourage private owners to maintain their woodlands in the condition that best serves the public interest, and that States having large areas of privately owned forests are advantageously situated to do this, without being hampered by the consideration of expense which stands in the way of acquiring public forests.

**Weir Experiments, Coefficients and Formulas,** by Robert E. Horton, has been re-published by the Geological Survey, in improved form, as Water Supply Paper, No. 200. Weir is a broader word than dam, including every kind of artificial obstruction.

**Report of Connecticut Forester.** The Annual Report of the State Forester of Connecticut, Austin F. Hawes, is at hand. The report discusses the farmer's interest in woodlands, and describes experiments in tree planting and woodlot improvement, also protection from fires. The whole State has been posted with notices regarding fires and the law concerning them.

Elsewhere in this issue of Forestry and Irrigation is published an article by Mr. Hawes, describing in detail the work done in transplanting by his department.

**The Chestnut in Connecticut, and Improvement of the Woodlot.** This is the title of Bulletin 154 of the Connecticut Experiment Station, written by the State Forester. It indicates where-

in forestry differs from the usual method of handling the woodlot. Almost every farmer owns a woodlot, but the returns are not what they should be. Farmers should be taught how to make their timber most valuable, and how to estimate the value of their lots before selling to lumbermen.

Many good investments in Connecticut can be made in cheap land already covered with a growth of tree sprouts; the value of such land may be multiplied by ten in the course of twenty-five years. Railroads and manufacturing companies might well take in hand the growing of their own timber.

Chestnut is the tree most largely used for electric poles, and it is such an important factor in the Connecticut woodlot that the treatment of the lot must in most cases conform to the demands of the chestnut.

**Census Bulletins.** Paper and Wood Pulp form the subject-matter of Bulletin 80 of the Census Bureau. Paper pulp is one of the largest forms of consumption of wood, and the heavy demand for paper is a serious factor in the forestry situation. The value of paper products increased over 20 per cent more between 1900 and 1905 than it did in the preceding ten years.

Agricultural Implements are treated in Bulletin 75. This manufacture, associated as it is with progress in farming methods, has exercised a far-reaching influence on the country's economic conditions. The scarcity of hardwood timber is becoming a serious matter in this industry.

**Circulars of the Forest Service.** Recent publications are:

Instructions for Making Forest Surveys and Maps.

Circular 101: The Open Tank Method for the Treatment of Timber. A marked saving in cost of equipment, in material and labor, and in transportation, is effected by the open tank

method of wood preservation instead of the older closed retorts.

Circular 105: White Oak in the Southern Appalachians. The Alleghany ranges and their westward plateaus are now the chief source of white oak. The uses of this durable and strong material are innumerable.

Circular 99: Forest Planting on the Semi-Arid Plains. In this naturally treeless region, though planting has been largely practiced, it has not kept pace with development; but by proper management enough timber can be grown to exercise a marked effect upon the supply of local needs.

---

**The Butte County Canal.** The Fourteenth Irrigation Congress appointed a committee to disseminate scientific information concerning irrigation, with a view to teaching the most approved methods of using water, and securing recognition of the advantages of irrigated agriculture. The first bulletin of this committee is on the Butte County Canal in the Sacramento Valley, California.

---

**California Reforestation.** A valuable booklet has been issued by the Tri-Counties Reforestation Committee, Riverside, California, designed to "impress on thinking people the necessity of calling a halt in the destruction of the timber at the source of the water supply of one hundred thousand acres of irrigated land in San Bernardino, Riverside, and Orange Counties." The pamphlet contains articles on the influence of forests upon run-off and the effects of deforestation in Syria, with a number of well printed and very attractive photographs. Public spirited people should give this pamphlet careful attention.

"Out West," for July, has an article, highly illustrated, by E. A. Sterling, on the Reforestation of Southern California.

"The Sunset Magazine," for August, contains an especially fine collection of pictures of mountains and waters in the Pacific Northwest.

---

**Opportunities of To-day.** This new magazine, the first number of which has just made its appearance, has been selected as the official organ for the National Corn Exposition, to be held in Chicago annually. The second number of the new publication will be al-

most entirely devoted to the exploitation of corn, its uses, and the manner of its utilization by various industries.

---

In order that every one may become acquainted with the forest laws of Massachusetts, the State Forester has compiled them all in a small booklet for distribution. The Forester stands ready to answer inquiries of all Massachusetts citizens. Another booklet from the same office contains a summary of the duties of forest wardens.

---

A Manual of the North American Gymnosperms, by D. P. Penhallow, professor of botany in McGill University, is announced by Ginn & Co. It will contain a systematic treatment of the species, and a concise account of their anatomy.

---

The Burlington Railroad has issued folders, available on application, describing several irrigated sections in the Northwest. The Bighorn Basin in northern Wyoming is a large area not fully settled. The Billings region in Montana is the location of extensive private irrigation works, in addition to the Huntley project of the Reclamation Service. This is a great sugar beet region. In the North Platte Valley of Wyoming and Nebraska is a long stretch of country irrigated partly by public and partly by private canals. Other free Government lands along the lines of the Burlington are described.

---

The magazine, "Government," published in Boston, had, in a recent issue, an article on "The Proposed National Forests in the White Mountains," by Governor Rollins, of New Hampshire. Valuable articles on this subject have appeared in many magazines this summer. It is fortunate so much attention is given this important subject.

---

The address of Prof. H. R. MacMillan, of the Yale Forest School, in New Brunswick, on First Methods of Forestry, was reported in a recent issue of the Canada Lumberman and Woodworker. He began by saying that so much more has been written concerning the why than the how of forestry, that a general discussion of the first steps taken in the establishment of a forest policy, in a country previously without one, is in order.

For Sale by FORESTRY AND IRRIGATION, 1311 G Street, N. W., Washington, D. C.

# IMPORTANT BOOKS ON FORESTRY

## PRINCIPLES AND PRACTICE OF FORESTRY

**Forest Mensuration.** By HENRY SOLON GRAVES, M. A. A complete text book of this important subject and the first written for American Foresters. It deals with the determination of the volume of log, tree, or stand, and with the study of increments and yields. Price, \$1.50

**Economics of Forestry, The.** By B. E. FERNOW. This volume treats of forests and forestry from the standpoint of political economy, and is designed to furnish a trustworthy basis for formulating public policy. Price, \$1.50

**First Book of Forestry, A.** By FILIBERT ROTH. An outline of the general principles of forestry, written in simple, non-technical language, designed particularly for the beginner. Price, \$1.20

**Practical Forestry, for Beginners in Forestry, Agricultural Students and Woodland Owners.** By JOHN GIFFORD. A general description of the principles of forestry with enough technical information to prepare the beginner. Price, \$1.40

**History of the Lumber Industry of America.** By J. E. DEFEAUGH. The first authoritative work of its kind yet issued, and one which will commend its self alike to the timber owner, lumberman, lumber manufacturer, or merchant, or student of economics. In four volumes bound in half leather. \$5.00 per volume.

**Forest Planting.** By H. NICHOLAS JARCHOW. An illustrated treatise on methods and means of restoring denuded woodland. Price, \$1.50

**Forestry.** (Schwappach.) An English translation of "Forstwissenschaft." Price, 70c.

**Hedges, Windbreaks, Shelters and Live Fences.** By E. P. POWELL. A treatise on the planting, growth and management of hedges with information concerning windbreaks and shelters. Price, 70c.

**North American Forests and Forestry.** By ERNEST BRUNCKEN. This volume, exhaustive in its character, is written in a style intended for the general reader, to whom it should convey a good idea of our forests forestry. Price, \$2.00

**Practical Forestry.** By ANDREW S. FULLER. A treatise on the propagation, planting and cultivation, with descriptions and the botanical and popular names of all the indigenous trees of the United States, and notes on a large number of the most valuable exotic species. Price, \$1.50

**Principles of American Forestry.** By SAMUEL B. GREEN. Prepared especially for students in elementary forestry and for the general reader who wishes to secure a general idea of forestry in North America. Price, \$1.50

**Seaside Planting of Trees and Shrubs.** By ALFRED GAUT. Illustrated from photographs by FRANK SUTCLIFFE. This is a new volume in the English Country Life Library. Advice regarding selection and management to get satisfactory effects under adverse influence of closeness to seashore. Price, \$1.75

**Profession of Forestry, The.** By GIFFORD PINCHOT. A pamphlet containing an address on that subject by Mr. Gifford Pinchot; also an address by Mr. Overton W. Price on "Study in Europe for American Forest Students," and a list of reference publications for students. Price, 25c.

## FOREIGN IMPORTATIONS

**English Estate Forestry.** By A. C. FORBES. An authoritative volume on English forest methods from the pen of a well known forester, that should prove of interest to Americans. Price, \$3.50

**Forstwissenschaft.** (Schwappach.) Price, 60c

**Manual of Forestry.** (Schlich.) Five volumes, complete, or separately as follows (price, complete, \$18.80);

Vol. I. "Forestry Policy in the British Empire." Price, \$2.40

Vol. II. "Silviculture." Price, \$3.50

Vol. III. "Forest Management." Price, \$3.60

Vol. IV. "Forest Protection." Price, \$1.80

Vol. V. "Forest Utilization." Price, \$1.80

This is perhaps the most authoritative work that has been issued on the technical side of forestry, translated from the German.

**Wood.** By G. S. BOULGER. An important new book for arboriculturists and forestry students. A manual of the natural history and industrial applications of the timbers of commerce. Cloth. 82 illustrations. Price, \$2.60.

**Familiar Trees.** By Prof. G. S. BOULGER. Written by an eminent botanical authority, yet couched in language easily understood. The coloured plates are the work of celebrated artists, and are truthful and trustworthy in every respect. A special feature is the series of photographic illustrations of sections of woods. Three volumes. Price, per volume, \$1.50.

## DENDROLOGY, BOTANY, AND IDENTIFICATION OF SPECIES

**Manual of the Trees of North America** (exclusive of Mexico). By CHARLES SPRAGUE SARGENT. A volume that presents in convenient form and with excellent illustrations, authoritative information concerning the trees of North America. It is written in a manner that enables the reader to readily find what family or species any particular tree belongs. Price, \$5.00.

**American Woods.** By ROMEYN B. HOUH. A new departure in the publication of an authoritative work illustrated with actual wood sections of the various species described. Three are given of each, viz., radial, transverse, and tangential. Issued in ten parts, per part Price, \$5.00

**Flora of the Southern States.** CHAPMAN. This is an excellent key to the flora of the south, complete and accurate in its scope. Price, \$1.00

**Getting Acquainted with the Trees.** By J. HORACE MCFARLAND. A handsome volume, copiously illustrated, and with facts accurately presented in an entertaining way. Price, \$1.75

**How Plants Grow.** By ASA GRAY. An understanding of the way in which a tree grows is of prime importance to the forester, and the matter here presented is accurate and authoritative. Price, \$1.00

**Manual of Botany.** By ASA GRAY. A key to the flora of the northeastern states, and the most authoritative publication of its nature. Price, \$1.82; field edition, \$2.00

**Our Native Trees.** By HARRIET L. KEELER. A popular key to the trees of the northeastern United States, presented in manner giving easy access to the text. The book is accurate, and as far as possible is written in a style which would make it interesting to the beginner. Price, \$2.00

**Our Northern Shrubs.** By HARRIET L. KEELER. This volume is planned on the same lines as the foregoing, and describes the shrubs which are native to the region extending from the Atlantic Ocean to the Mississippi River and from Canada to the northern boundaries of our Southern states. The arrangement is by families and each member is given a popular and scientific description. Price, \$1.00

**Principal Species of Wood; Their Characteristic Properties.** By CHARLES HENRY SNOW. No attempt is made to give exhaustive descriptions of species, but the author presents a mass of information designed for the use and instruction of woodworkers, etc., in a popular style. A host of concise information is brought under each head, and the work is a valuable one. Price, \$0.50.

These books sent prepaid upon receipt of price indicated, by FORESTRY AND IRRIGATION, 1311 G Street, N. W., Washington, D. C.

*Important Books on Forestry and Irrigation for sale by FORESTRY AND IRRIGATION  
1311 G Street, N. W., Washington, D. C.*

**Trees of New England.** By L. L. DAME and HENRY BROOKS. This book is a small volume which can be easily put in the pocket and carried in the woods, and at the same time is the best guide to the identification of our New England trees of any of the smaller books yet published. *Price, \$1.50*

**Trees of Northeastern America.** NEW-HALL. A good general check list of the more important trees of the northeastern United States. *Price, \$1.75*

**Trees and Shrubs.** By C. S. SARGENT. The most thorough and authoritative publication yet issued, and a standard work. The matter is issued in parts, of which there are three already published. *Price, per part, \$5.00*

**Trees, Shrubs and Vines of the Northeastern United States.** By H. E. PARKHURST. In this book the author describes the trees, shrubs, and vines of the northeastern United States in a popular way, the book being designed especially for persons who have never studied botany. To these it will appeal as a valuable guide to a familiarity with the salient characteristics of trees, shrubs and vines. *Price, \$1.50*

**Trees.** A handbook of forest botany for the woodlands and the laboratory. By H. MARSHALL WARD. Vol. I. Buds and twigs. Vol. II. Leaves. Vol. III. Flowers and inflorescences. Three volumes to be added, on Fruits and seeds, Seedlings, Habit and conformation of the tree as a whole. *Price, per volume, \$1.50*

### DESCRIPTION OF PARTICULAR SPECIES AND LOCALITIES

**Mountains of California, The.** By JOHN MUIR. No other person is so well fitted to write of the mountains of California as John Muir, and the volume presented here describes not only the mountains themselves but the trees that clothe them and the wild life which they harbor. *Price, \$1.85*

## BOOKS ON IRRIGATION AND DRAINAGE

**Irrigation in the United States.** By F. H. NEWELL. The most authoritative and complete work on the subject which has yet been published, by the head of the Government's irrigation work. *Price, \$2.00*

**Irrigation Farming.** By L. M. WILCOX. A newly revised edition of one of the standard works on irrigation. The principal chapters treat very fully of irrigation, its application, etc., and the volume is profusely illustrated. *Cloth, \$2.00*

**Irrigation for Farm, Garden and Orchard.** By HENRY STEWART. This work is offered to those American farmers and other cultivators of the soil who, from painful experience, can readily appreciate the losses which result from the scarcity of water at critical periods. *Price, \$1.00*

**Irrigation and Drainage.** By F. H. KING. While most of the existing books on these subjects have been written from engineering or legal standpoints, this one presents in a broad yet specific way the fundamental principles which underlie the methods of culture by irrigation and drainage. *Price, \$1.50*

**Irrigation Institutions.** By ELWOOD MEAD. A discussion of the economic and legal questions created by the growth of irrigated agriculture in the West, by the Chief of Irrigation and Drainage Investigations of the Department of Agriculture. *Price, \$1.25*

**Land Draining.** By MANLY MILES. A handbook for farmers on the principles and practice of draining, giving the results of his extended experience in laying tile drains. *Price, \$1.00*

**Land of Little Rain, The.** By MRS. MARY AUSTIN. A nature book of the highest type. The volume is made up of a series of sketches of the human, animal, and plant life found in the region of the Mohave desert, Death Valley, and the Sierras, much of which the average person is likely to consider almost devoid of living things. *Price, \$2.00*

**Our National Parks.** By JOHN MUIR. If you want to learn about the glaciers, mountain peaks, canyons and great waterfalls of the West; of the habits of animals from the squirrel to the moose; plant life from the big trees to the wild flowers—in fact be brought face with nature's works, this is the book. *Price, \$1.50*

**Trees and Shrubs of Massachusetts.** EMERSON. Two volumes. Plain cloth edition has 148 plates. The colored edition has 36 of these in colors. *Price, plain, \$12.00. Price, colored, \$18.00.*

**The Earth as Modified by Human Action.** By G. P. MARSH. A Revision of Man and Nature. Describes changes in the face of the earth caused by man, including desolation of various countries, once thickly inhabited, by removal of forests. Shows importance of maintaining natural balance of forces. *Price, \$—*

**The Longleaf Pine in Virgin Forest.** A Silvical Study. By G. FREDERICK SCHWARZ. This is a study of the life history of this important forest tree. Intended primarily for foresters and forest students; also for owners and managers of pine timber lands. Deals with the preference or dislike of the species for particular conditions of soil, climate, and environment. Illustrations and six tables. *Price, \$1.25*

### IMPORTATIONS

**Beautiful Rare Trees and Plants.** By the EARL OF ANNESLEY. A description of some of the rarer English trees, shrubs and vines, illustrated copiously. *Price, \$12.00*

**Forests of Upper India and Their Inhabitants.** By THOMAS W. WEBBER. This volume is an account of the author's life in India during the period shortly after 1857. It contains a vivid description of the country, its people, customs, etc., with some description of its forests and timber wealth. *Price, \$5.00*

### IRRIGATION ENGINEERING AND CONSTRUCTIVE WORK

**Design and Construction of Dams.** By EDWARD WEGMANN. This volume includes an authoritative discussion of the constructive work involved and the principal forms of construction. Masonry, rock-fill and timber dams are discussed extensively. *Price, \$5.00*

**Improvement of Rivers.** By B. F. THOMAS and D. A. WATT. This volume is a treatise on the methods employed for improving streams for open navigation and for navigation by means of locks and dams. *Price, \$6.50*

**Irrigation Engineering.** By HERBERT M. WILSON. This is the fourth edition of Mr. Wilson's popular work, and the revision and enlargement which it has undergone, places it at the forefront of text books on the subject for American students. *Price, \$1.00*

**Engineering for Land Drainage.** By C. G. ELLIOTT. A manual for laying out and constructing drains for the improvement of agricultural lands. *Price, \$1.00*

**Reservoirs for Irrigation, Water-power, and Domestic Water-supply.** By JAMES DIX SCHUTLER. An account of various types of dams and the methods and plans of their construction, together with a discussion of the available water-supply for irrigation in various sections of arid America, distribution, application, and use of water; the rainfall, runoff, and evaporation from reservoirs, and effect of silt, etc. *Price, \$5.00*

**Water Supply Engineering.** By A. PRESCOTT FOLWELL. A treatise on the designing, construction and maintenance of water-supply systems, both city and irrigation. *Price, \$4.00*

*These books sent prepaid upon receipt of price indicated, by FORESTRY AND IRRIGATION  
1311 G Street, N. W., Washington, D. C. (over)*







## 1,900 ACRES Stumpage For Sale.

3,000 feet oak per acre; 75 per cent white oak, 30 per cent 30 inches and over in diameter. Gum and elm enough to make 6,000 M. per acre in all. New railroad over land; Iron Mountain system. Lumber rate to St. Louis, 13c; Cairo, 11c. I own the property. Am not a real estate agent.

**S. SAMPSON CARSON,**  
Ripley, Tenn.



## Rife Hydraulic Ram

(Pumps Water by Water Power)

**Town Water Works,  
Railroad Tanks, Irrigation,  
Country Homes, Greenhouses.**

*No Attention—No Expense—Runs Continuously.*

Operates under 18 inches to 50 feet fall. Elevates water 30 feet each foot of fall. 5000 in successful operation. Sold on 30 days trial. Catalog and estimate free.

**RIFE HYDRAULIC RAM COMPANY,**  
111 Trinity Bldg., New York.

California, Alta, Placer County

## AGASSIZ HALL

is a boys' Preparatory School in the Sierra Nevada Mountains. Its boys are encouraged to ride, row, swim, fish, hunt, trap, snowshoe as out-of-school aids toward developing healthy manhood.

## HARVARD UNIVERSITY

**The Graduate School of Applied Science and  
The Lawrence Scientific School**

offer graduate and undergraduate courses in Civil, Mechanical, Electrical, Mining and Metallurgical Engineering, Architecture, Landscape Architecture, Forestry, Physics, Chemistry, Biology and Geology.

For further information, address **W. C. SABINE,**  
15 University Hall, Cambridge, Mass.

Read "Irrigation in the United States," by Frederick Haynes Newell, Director of the Reclamation Service. Price, \$2, postpaid to any address. Address "Forestry and Irrigation," Washington, D. C.

## ORCHIDS

We are the largest Orchid Growers  
in the United States  
Our Illustrated and Descriptive  
Catalogue of Orchids is now ready  
and may be had on application

Orchid Growers  
and Importers

**LAGER & HURRELL,**  
Summit, N. J.

## Investors Read The Wall Street Journal

DOW, JONES & CO., Publishers, 44 Broad Street,  
New York.

# FOREST PLANTS

Millions in stock, very cheap, also Thorn for Hedges and Fruit Stocks a specialty. The Largest Nurseries in Germany. Shipments of 150 millions of plants annually. Catalogues and references free on application.

**J. HEINS' SONS,**

Halstenbek, nr. Hamburg, Germany.

# BUILD YOUR OWN BOAT

## BY THE BROOKS SYSTEM Of Full Size Patterns and Illustrated Instructions.

You need no tool experience—no previous knowledge of boats. Our big free catalog gives hundreds of testimonials—tells how a profitable boat building business may be established. Send for it.

Patterns of all Row Boats and Canoes, \$16.82

Patterns of Launches and Sail Boats under 30 feet, \$28.82

We sell knock-down frames with patterns to finish for less than it costs others to manufacture.

15½-Foot Launch Frame and Patterns, \$12

16-Foot Launch Frame and Patterns, \$15

22-Foot Speed Launch Frame and Patterns, \$22

Other prices in proportion.

Still inexperienced people built boats by the Brooks System last year. Why not you?

**FREE ILLUSTRATED CATALOG** Quotes prices on all patterns, knock-down frames with patterns to finish, and complete knock-down boats.

**SATISFACTION GUARANTEED OR MONEY REFUNDED.**



## Biltmore Forest School

Biltmore, N. C.



Theoretical and practical instruction in all branches of applied forestry.

Course comprising twelve consecutive months can be entered at any time of the year—no vacations.

Object lessons within the mountain estate of George W. Vanderbilt, comprising 120,000 acres, where forestry has been practiced since 1895



For further information apply to

**C. A. Schenck, Director**

## COLORADO SCHOOL OF FORESTRY...

Colorado Springs, Colo.

Three years' course in  
TECHNICAL AND  
APPLIED FORESTRY

Winter Term at Colorado College, Colorado Springs.  
Summer Term at Manitou Park on the borders of the Pike's Peak Forest Reserve.

**TUITION, SIXTY DOLLARS  
— A YEAR —**

For further particulars apply to

**WM. C. STURGIS, Dean**

Colorado Springs - - - - - Colo.

## YALE FOREST SCHOOL NEW HAVEN. . . CONNECTICUT

The course of study in THE YALE FOREST SCHOOL covers a period of two years. Graduates of collegiate institutions of high standing are admitted as candidates for the degree of Master of Forestry.

The Summer School of Forestry is conducted at Milford, Pike County, Penna.

For further information address

**Henry S. Graves, Director, New Haven, Conn.**

